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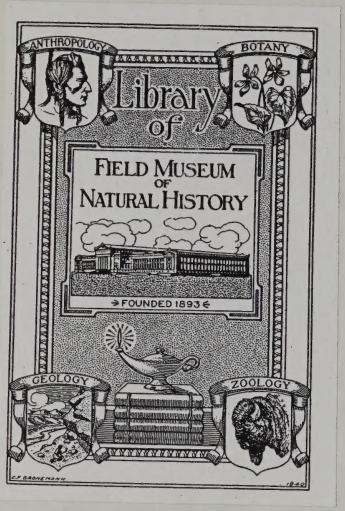

Vol. 29, No. 1 March 2001
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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America, Inc.

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CONCHOLOGISTS OF AMERICA, INC.

VOL. 29 No. 1 *MARCH 2001*

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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MEMBERSHIPS are for the calendar year, January-December, late memberships retroactive to January. **2001 DUES:** (USA) $20.00; **Postal surcharge:** $5.00 for Canada and Mexico; $10.00 for other Western Hemisphere nations; $12.00 for Europe; $15.00 for Asia, Africa and the Pacific Rim. Please pay in U.S. dollars, or with a check on a U.S. bank with Transit Enrouting and Account Numbers printed at the bottom, or with money order; make checks payable to CONCHOLOGISTS OF AMERICA. **NEW MEMBERS** apply to Doris Underwood, MEMBERSHIP DIRECTOR. **RENEWALS** go to TREASURER, Phil Dietz. **BACK ISSUES** are available from PROPERTIES DIRECTOR Hank Foglino, 4 Trent Court, Smithtown, NY 11787-1266. Prior to 1985 $3.00 each; 1985 to current $5.00 each.

PRESIDENT'S MESSAGE

The year 2001 has just started and already it seems that the convention is just around the corner. I hope that all of you are tuning in to Conch-L as Bobbi Cordy and the convention crew keep us all up to date on what is going to happen at 2001 Space Odyssey. Cape Canaveral is also trying to cooperate with a launch around convention time.

Thanks to all the members who turned in their Neptune Award nominations. The board will consider all nominees at the midyear meeting and the winners will be awarded at the Annual Meeting at the Convention.

Remember that we are now a 501c3 organization, which means that your gifts and donations are tax deductible. If anyone is considering a memorial or large donation please be patient with us as we get all of the guidelines in order. Keep us in mind as you prepare your will or look for an organization to make a donation to. COA is a growing organization and gifts and donations aside from the auction and convention will help fund our grants. The Walter Sage Fund has grown and now supports part of a grant. Gary is hard at work with his committee, screening all of the grant applicants. This year's grants will be awarded at the Annual Meeting.

Looking forward to seeing all of you at the convention.

Betty Lipe

Register Now For 2001 Shell Odyssey

Flowers to.....

Doris Underwood, COA's Membership Director who underwent knee-replacement surgery in late February. Keep up with that exercise, Doris!

253552

COVER: March's cover photo is the work of Marcus Coltro of Femorale, Inc. Marcus is a shell dealer who lives in Brazil. Reach him at <shells@femorale.com.br> This lovely and rare slit shell, *Perotrochus atlanticus* (Rios and Matthews, 1968), a 75 mm specimen, was trawled live from 100-120 meters by fishermen off Cabo Frio, Rio de Janeiro in southern Brazil. Marcus is a dedicated and talented photographer of the shells he and his brother Jose (COA's Publicity Director) acquire for their shell business. The colorful cover design is the work of our Photographic Editor, Jim Miller. The back cover, a remarkable array of color forms of *Euvola ziczac* (Linné, 1758) , is also Jim's work. The gorgeous shells are all by-products of shrimping, from Florida to Colombia and Venezuela.

3 – 2 – 1 BLAST OFF

by Bobbi Cordy, COA 2001 Convention Co-Chair

The Astronaut Trail Shell Club is ready to blast off for 2001 Shell Odyssey at Cape Canaveral on July 7-11. All you need to do is get your registration form in no later than June 7! Registration after that date will take some special processing and will cost you an extra $10. ATSC is guaranteeing that you will have a great time at this convention.

Countdown begins on July 6 with a field trip to Harbor Branch Oceangraphic Institute. You will be transported by bus from the Radisson Resort to Fort Pierce at 8 a.m. The tour will include a **Campus and Wildlife Tour**. You will learn about oceanographic research at Harbor Branch, see wildlife galore, and view aquaculture displays of fresh-water and marine animals. You will then be treated to a buffet luncheon followed by a **Lagoon Wildlife Boat Tour** to explore the history and ecology of the Indian River Lagoon, including bird life, dolphins and manatees. You will return to the Radisson around 5 p.m., just in time to meet registering conventioneers and make plans for supper.

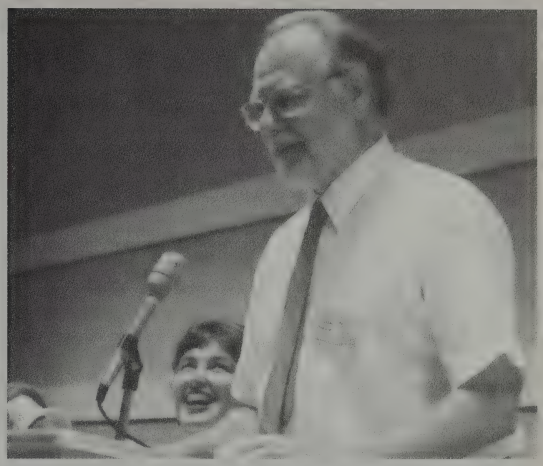
The convention will open officially on Saturday, July 9 at 1:30 p.m. with a special **Opening Ceremony** and a couple of great programs. The evening **Welcome Party** is Caribbean Style with Caribbean food and some super entertainment planned. So get out that splashy cruise attire!

Sunday will be a very FULL day with six programs during the day and workshops in the evening. **Be sure to sign up for your choice of workshops when you register!!!** All this will be followed by one of the nightly **Turtle Watches**.

Monday morning opens with one of the silent auctions and set-up of the Mini Shell Show (Single Specimens only). **You must have your Mini Shell Show entry in by June 7!** We are expecting to see some fabulous shells and there is even a category for our dealers. The oral auction, with a tantalizing 17 slit shells and more, will take up most of the afternoon. You may request an auction list by sending a self-addressed stamped envelope to John Baker, 8745 So. Tropical Trail, Merritt Island FL 32952. Outside bids will be accepted. In the evening enjoy some of the local restaurants, a walk on the beach (frequent free transportation by the hotel to the beach) and a meeting of the Conch-L enthusiasts.

Tuesday July 10 will preview the **2002 Convention.** The annual business meeting and election of officers will follow. **Bourse set up** begins at noon–4 p.m. This is a good time to spend doing some time sightseeing or lounging the waterfall pool! **Bourse opens at** 4 p.m. and remains open until 10 p.m. There'll be a nearby snack bar and cash bar for your convenience.

Wednesday the Bourse runs from 9 a.m. until 1 p.m. Two more field trips this day include **Spaceport USA**. The bus leaves the resort at 9 a.m. and returns at 4 p.m. This is a fantastic tour. (We understand there is a possibility the shuttle will be on the pad ready to blast off on Thursday.) For those who have already done this tour, a lovely **Riverboat Luncheon Cruise** will take you along to see manatees, dolphins and much more.



COA welcomes S. Peter Dance as our 2001 banquet speaker. This is his second appearance at an Astronaut Trail COA Convention—Peter was also banquet speaker for the Countdown COA 1990 convention. That's then-president Peggy Williams looking on.

At 6 p.m. the cash bar opens to begin the **Annual COA Banquet**. Winners of the mini shell show and raffle items will be announced at the banquet. Special Speaker is **Peter Dance** (he will be spending the entire week with us). Peter will be speaking on **"A Bountiful Half Century."** He will assess the significance of the last fifty years to those who grow enthusiastic over rare and beautiful shells by comparing some of the shells discovered during that time with those discovered during the previous four half centuries. He hopes to show that we have just lived through an exceptionally exciting period in the history of conchology. He will illustrate his talk primarily with images of volutes, including many of great beauty and rarity, but he will also refer to outstanding discoveries of other kinds of shells made since 1950. His talk may persuade us that the next half century could be just as exciting.

Added to all this will be the **bargain tables**, **silent auctions**, great new **T-shirt** design featuring Conchologists of America that can be worn to future conventions and shell shows, some **great raffle items** and much, much more. More details and registration forms can be printed from the website:

http://coa.acnatsci.org/conchnet/coaconv.html

The Astronaut Trail Shell Club is really looking forward to this event and we want to make sure your week is a fabulous one!

Bobbi Cordy, Co-Chairman COA 2001 A Shell Odyssey

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SCUM V Update

Don't miss the article on page 16 on SCUM V! It has lots of news of new and ongoing research. For instance, did you know that Dr. James McLean of the Natural History Museum of Los Angeles County, THE man to ask about the Trochoidea, is at work on a worldwide revision of those fascinating Liotiidae?

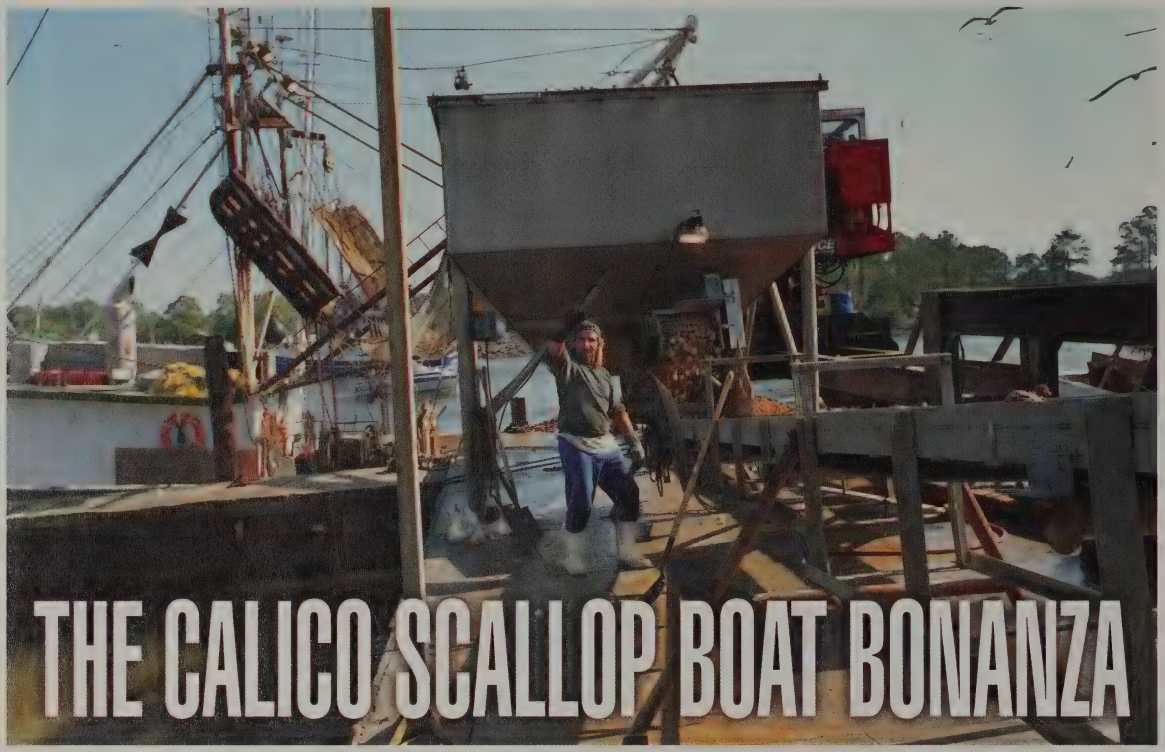
In Memoriam

Thomas Hale

Patricia Esworthy

Harold Lieberman

Dominic Rawlingson-Plant



THE CALICO SCALLOP BOAT BONANZA

by Jim Miller
photos by the author

I must preface this article by saying that due to circumstances beyond my control, I was forced to put my love of seashells on hold from the late 1970's until a few years ago. It wasn't until I moved back to Florida after lengthy stays in areas of the country far from the ocean that I rediscovered my passion for shells. And therein lie the beginnings of our story.

In September of 1997, my wife Margo, a native Californian, asked if I had ever been to a popular vacation destination she had read about called Sanibel Island. I told her that back in the 1960's I traveled to the island before there was even a bridge. Back then, you had to take a car ferry from Fort Myers across that stretch of water known as San Carlos Bay. I told her of my many hours sitting in huge piles of shells, trying to find specimens that matched the illustrations in a small book of Florida seashells my grandparents had bought me. I also told her that during the early 1970's, I had made many long day trips from my Miami home to shell the Sanibel beaches, as well as those of Bonita Springs, just south of Fort Myers.

Now, as my wife is a budding photo enthusiast and diehard bird fancier, and since Sanibel Island is much closer to us now that we live in Tallahassee instead of Sacramento, it seemed like a perfect place to go to celebrate my birthday. We would have plenty of opportunity to stroll along the beaches, as well as to visit the "Ding" Darling Wildlife Refuge and the nearby Corkscrew Swamp in search of Roseate Spoonbills and Wood Storks.

We flew to Tampa, rented a car and drove the rest of the way. As we passed the toll booth and made our way onto the causeway, I was again swept away by my memories of this magical place. I pulled the car over on one of the two small islands that the bridge crosses before reaching Sanibel itself. Fortunately, it was a fairly low tide and I was thrilled to find, almost immediately, a live Crown Conch (*Melongena corona*) and then a small Lightning Whelk (*Busycon sinistrum*). My wife was impressed that I still knew the right places to look.

During our weeklong stay, we hit all the popular beaches, stopped to buy some "collector's shells" from the shell shops on the island, and

While far short of a record, at just over 68 mm, this is a fairly large Calico scallop taken in the Northern Gulf of Mexico.

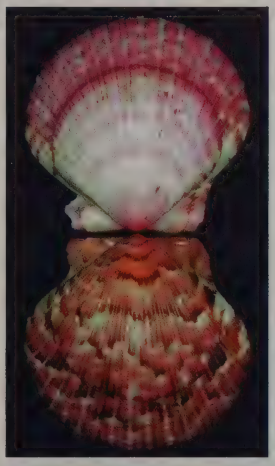
Jim Miller is COA's Photographic Editor. 2312 Bourgogne Drive, Tallahassee FL 32308
Email: Jim_Miller@ mindspring.com

Orange calicos are rare. Perhaps one out of a thousand specimens exhibit the brilliant orange coloration. They are often more heavily covered with barnacles and other marine organisms, making good specimens even harder to collect.

saw all the birds Margo had never seen except in bird books. We even managed to burn ourselves to a crisp under the blazing sun when we weren't dodging the late afternoon thunderstorms. My only disappointment was that there didn't seem to be many good shells on the beaches, with the exception of a goodly number of small but colorful Calico scallops (*Argopecten gibbus*) that had blown in the week before. When our vacation finally came to an end, we promised ourselves that we would come back again—and so we would, many times, but that's a story for another time.

Returning home, I cleaned and oiled the nicest of the scallops we had found, put them in plastic bags and stored them in a plastic shoebox. And that might have been the end of this story. However, in October of 1998, our local newspaper, the *Tallahassee Democrat,* ran a story telling of the surprise return of Calico scallops to the waters off the Florida panhandle. According to the article, it had been five years since there had been enough scallops to make it worthwhile for

(Continued on page 10)



One-of-a-kind Calico: Out of hundreds of thousands of scallops seen by the author, this is the only specimen found with bright pink on the lower valve.

Another one-of-a-kind discovery by the author: A red *Argopecten gibbus*, the only one seen while the author was offloading the scallop boats.

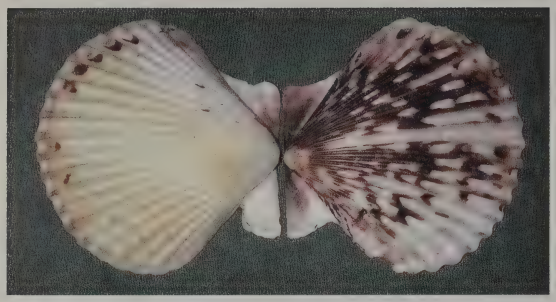
Calico comparison: The smaller specimens on the left are from Sanibel Island and are fairly representative of *A. gibbus* from that locale. Meanwhile, the three larger scallops are Calicos taken in the Northern Gulf south of Carrabelle, Florida.

While typical Northern Gulf *Argopecten gibbus* are typically not as colorful as southern forms, these specimens are just a few of the more colorful Northern Gulf Calicos collected by the author.

A small sampling of the many specimens of *Scaphella junonia* collected by the author while offloading the scallop boats on Timber Island.

Rediscovering *Argopecten aequisulcatus*

By Paul Kanner and Jim Miller
Photos by Jim Miller



***A. aequisulcatus* 73 mm.**

Nothing is more exciting to a shell collector than making an unexpected discovery. It could be finding the very first specimen of a species we haven't personally collected before. Or maybe chancing upon an uncommonly large or colorful specimen of a particular species. As it happens, in this case, it was stumbling upon a scallop in a particular location that came as a total surprise.

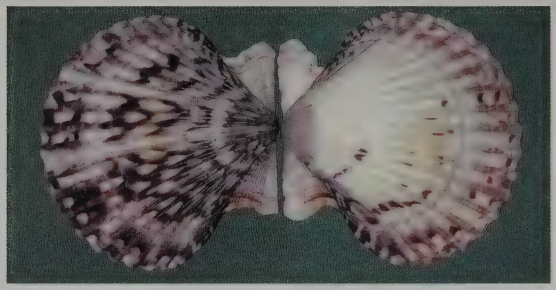
Back in late February of 2000, Paul Kanner's son, Richard, brought him a shell he had found while fly fishing in the waters of Newport Harbor, situated between Costa Mesa and Irvine, just south of Anaheim, California. To Paul's surprise, it was a valve from what appeared to be a rather large *Argopecten aequisulcatus* (Carpenter, 1864). Though Paul had never personally collected the species, he had some in his collection that were found by Chuck Reitz in Carlsbad Lagoon near San Diego in 1996.

For those who may be unfamiliar with this scallop, *A. aequisulcatus* has been considered by some authors as a subspecies of *Argopecten ventricosus* (formerly *A. circularis*). Rombout, in his *Guidebook to Pecten Shells*, lists it as *A. circularis aequisulcatus* and gives the locale as Northern California. Meanwhile, Myra Keen, in her *Seashells of Tropical West America*, gives it species status and reports it to differ from *A. ventricosus* by being larger and duller colored and tending to live in bays. However, Keen notes that it has been reported both along the outer coast of Baja California and also into the southern part of the Gulf of California as far as La Paz. Needless to say, such conflicting information indicates that there is a lot about this species that remains to be learned.

A. *aequisulcatus* 81 mm.

Paul Kanner, 10609 Esther Ave, Los Angeles CA 90064-3202 Email: pkann@mediaone.net
Jim Miller, 2312 Bourgogne Drive, Tallahassee FL 32308
Email: jim_miller@mindspring.com

During the next minus tide, on March 18th, Paul decided to have a look for himself. His son Richard had actually found the original shell on the east side of the Pacific Coast Highway Bridge along Highway 1 and was happy to show his father exactly where he had picked it up. There is a small parking area off the highway, and then a path that leads to a fairly steep, 20-foot drop-off onto the tidal flats. This area at low tide is very mucky and it is easy to end up sinking to your hips in the mud if you're not careful. Paul and Richard didn't have to search very long before they began finding single valves of the species; eventually Paul found several large, dead pairs. The largest of the specimens he brought back from this expedition measures an astounding 98 mm or nearly four inches, though the average size of the shells was in the 70-80 mm range.

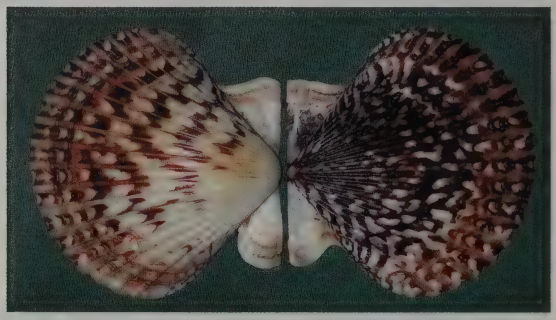


***A. aequisulcatus* 72 mm.**

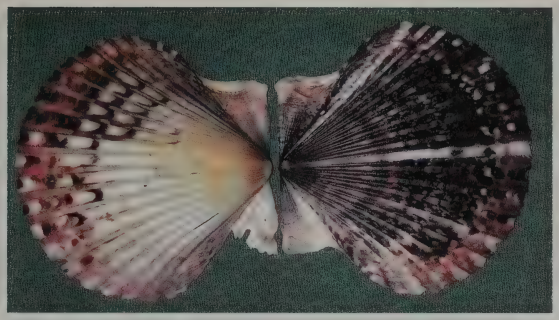
Eventually, the Kanners began to find live specimens of *A. aequisulcatus* in the mud along with large numbers of the California Bubble Shell (*Bulla gouldiana*, Pilsbry, 1895). There were also quite a few other bivalves, most of which were the Common California Venus, *Chione californiensis* (Broderip, 1835) and *Protothaca laciniata* (Carpenter, 1864), the Roughsided Pacific Littleneck clam.

In California waters, *Argopecten aequisulcatus* is a protected species and the taking of live specimens carries a heavy fine, so Paul was unable to collect live specimens. Fortunately, there were numerous fresh dead shells—many of them still in pairs—making live collecting unnecessary. After about an hour of collecting, Paul had found a good number of specimens for his own collection, as well as for trade. As the tide began to come back in, Paul and Richard slowly made their way back through the muck to where their truck was parked. They stowed their muddy boots in the back of the truck and cleaned off as best they could with a few buckets of fresh water.

In subsequent conversations with another local fly fisherman, Paul learned that at certain times of the year, you can actually look down from the Pacific Coast Highway Bridge and see the bottom of the bay littered with scallops. This is particularly good news since it was feared that the species was quickly vanishing from local waters. But



***A. aequisulcatus* 76 mm.**



A. aequisulcatus 75 mm

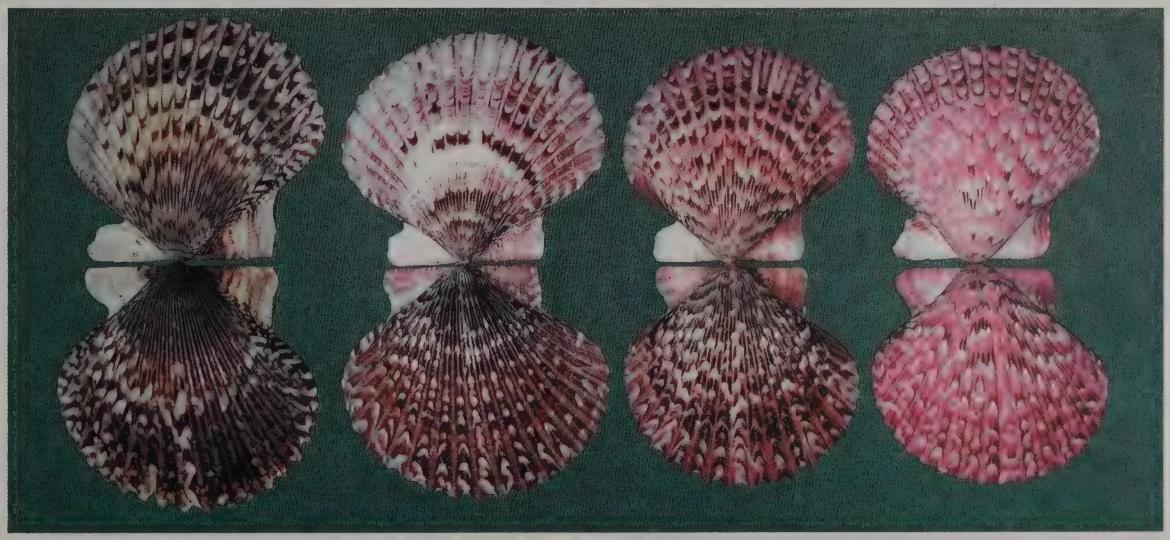
A. aequisulcatus 72 mm.

since Paul dives almost every week off Los Angeles, he has seen a remarkable resurgence in populations of many species, indicating that the waters are getting cleaner—which is great news.

Both authors agree that *A. aequisulcatus* is quite distinct from any specimens either has seen of *A. ventricosus* and further study will most likely confirm full species status. Jim Miller has quite a few specimens of what appears to be an intergrade between the two species, obtained from a large collection of shells a shell dealer purchased from a former resident of Baja California. Interestingly, these particular specimens were identified as being *A. aequisulcatus*, which they definitely are not. When set in a group (see photo below), it is quite easy to see the progression of forms from one species to the other.

A collection of *Argopecten aequisulcatus* made in April of 1996 by Chuck Reitz. These were found dead on sand in Carlsbad Lagoon, San Diego, California. They are roughly half the size of the Newport Bay form.

Despite the fact that it does not boast the brightly colored valves of other scallop species, *Argopecten aequisulcatus* is still a handsome shell as the photos on these pages illustrate and it is a wonderful addition to any scallop lover's collection. What's more, its surprising discovery in the waters of Newport Harbor may be an indication that the species is making a remarkable comeback.



***Argopecten* intergrades: *A.aequisulcatus* is on the left, while *A. ventricosus* is on the right. In between are just two of the variable intergrades that can be found between the two species.**

NEW FINDINGS IN SOUTHERN BRAZIL

by José Coltro Junior
photos by
Marcus Coltro

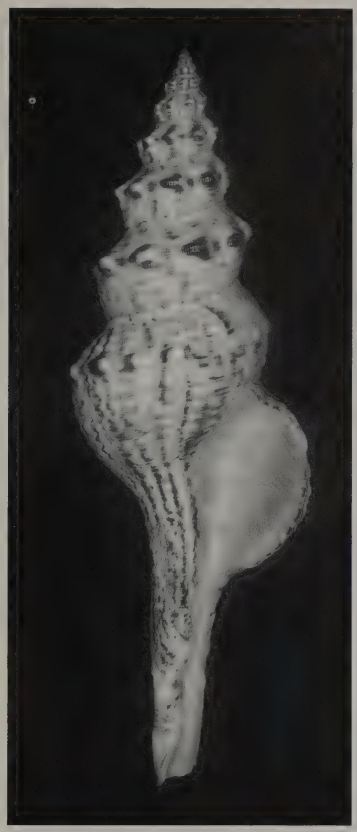
These past months I've begun receiving some great species from southern Brazil where my associates have been working in some small Brazilian ports, contacting trawlers. From Rio de Janeiro State to Santa Catarina State most shrimp fishing is done in depths between 40 and 150 meters, but recently some boats have begun fishing depths up to 400 meters. To convince those fishermen to bring back shells is very hard work. First, they don't understand why I need shells. Second, boat owners usually don't want any activity that might compromise the fishing. And third, according to some of them, shells bring bad luck. Anyway, it took some extraordinary effort to finally establish a relationship with the boats and to begin receiving shells!

My first try was a small place near Cape of São Tomé, in the north part of Rio de Janeiro State. It was there, many years ago, that I found my first specimens of a very nice species, *Odontocymbiola saotomensis* Calvo & Coltro, 1993. During my first trip to buy from the fishermen, I found only some *Buccinanops gradatum* (Deshayes, 1844) and *Olivancillaria urceus* (Röding, 1798), though some of them were a beautiful orange color. I also got few dead but nice *Agaronia travassosi* Morretes, 1938. On following trips I obtained some other great species, including, finally, the *O. saotomensis*. The fishermen

1. ***Adelomelon simulatrix*** **(Leal and Bouchet, 1989), 128.7 mm, off Laguna, Santa Catarina State, trawled 300-400 meters.**
2. ***Conus sp.*****, 59 mm, off Niteroi, Rio de Janeiro, trawled 120 meters.**
3. ***Conus xanthocinctus*** **(Petuch, 1986), 36.7 mm, off Cabo Frio, Rio de Janeiro, trawled 100-120 meters.**
4. ***Semicassis labiata iheringi*** **(Carcelles, 1953), 57 mm, off Niteroi, Rio de Janeiro, trawled 100-120 meters.**
5. ***Zidona dufresneyi*** **(Donovan, 1823), 222 mm, off Cabo Frio, Rio de Janeiro, trawled 100-120 meters.**
6. ***Chicoreus tenuivaricosus carioca*** **(Vokes, 1968), 66 mm, off Santos, São Paulo State, trawled 70-90 meters.**
7. ***Odontocymbiola saotomensis*** **(Calvo and Coltro, 1997), golden form, 68 mm.**
9. ***Calliostoma militaris*** **(von Ihering, 1907), 29.5 mm, off Niteroi, Rio de Janeiro, trawled 100-120 meters.**

Note: Specimens on page are not to scale.

Femorale, Cx. P. 15011 São Paulo SP Brazil 01599-970. Email: shells@femorale.com.br



***Fusinus brasiliensis* (Grabau, 1904), 127mm, off Cabo Frio, Rio de Janeiro, trawled 100-120 meters.**

brought back great olivid species like *Ancilla dimidiata* (Sowerby, 1850); *Olivancillaria uretai* and *O. carcellesi* Klappenbach; color forms of *Agaronia travassosi* and *Olivancillaria steeriae* (Reeve, 1850); as well as very nice and spiny *Dorsanum moniliferum* (Valenciennes, 1834) and other species.

These exciting results encouraged me to try other places like Cabo Frio and Niteroi. In Niteroi, while visiting some boats, I had to jump from one boat to another. Imagine me doing that! Me and my 130 kilos (286 pounds)! You can't believe what that was like! On one of the boats I had to use a small wood staircase, and guess what happened—the little stair was simply destroyed! In another I had to use a metal stair; it wasn't bolted down correctly so I almost had a sea bath! But my life-threatening efforts produced results! In Niteroi, where they trawled at depths of 100 to 150 meters, I obtained some *Perotrochus atlanticus* Rios & Matthews, 1968, though most had worm damage. I also got some beautiful *Zidona dufresneyi* (Donovan, 1823), gorgeous *Semicassis labiatum iheringi* (Carcelles, 1953) and great *Tugurium caribaeum* (Petit, 1856). Again, I had problems convincing them to collect small species, but in the end they agreed. They brought me species like *Prunum martini* (Petit, 1853) and *Calliostoma militaris* von Ihering, 1907. Now I am also getting a variety of small species from Cape São Tomé, including some new species.

In Cabo Frio, contact with the boats is somewhat difficult because they are in a restricted area where you can go only with special permission. Even so, I was able to get some rare and beautiful *Conus xanthocinctus* —just a few specimens but with fantastic color variation. One of my helpers went to Santa Catarina State in southern Brazil to try to contact fishing boats there. Santa Catarina is our German state —a great percentage of the population is of German descent. There, they have the best trawlers, but most of them use large nets for fish, not shrimp. They trawl at depths of 400 meters and eventually they get some large shells, especially *Adelomelon beckii* (Broderip, 1836). But they have found few rare *Adelomelon riosi* Clench, 1964 and four of the extremely rare *Adelomelon simulatrix* (Leal & Bouchet, 1989). They process most of their catch while still at sea so they bring back shells only occasionally. Those shells are really hard to obtain, but the rewards are so exciting that I will continue my efforts to get them!

***Calliostoma sp.*, 16.7 mm, off Cabo de São Tome, Rio de Janeiro, 30-40 meters.**

***Adelomelon riosi* (Clench, 1964), 258 mm, off Laguna, Santa Catarina State, trawled 300-400 meters.**

(Miller article continued from page 5)

Towards the end of the season, specimens of *Fasciolaria lilium tortugana* became rather common.

shrimpers to make the switch to scalloping. In fact, they had first noticed the return of the scallops because their nets were being torn apart by the weight of all the scallops they had inadvertently caught while shrimping.

Recalling the beauty of the Sanibel scallops, I called a few seafood distributors in our area and eventually was directed to a company in Apalachicola that was supplying them. I called the company and was told that I could indeed come by and pick out some shells. So that weekend, we made the hour-and-a-half drive to the sleepy little town to get a few scallop shells to add to our collection.

Following directions we had been given, we pulled into the parking lot. I had to slam on the brakes when I saw, not a few small piles of scallop shells, but what looked like mountains of them! It being a Sunday, nobody was in the office, so we took our plastic bags and headed for the nearest scallop mound.

Now I must say here that our initial enthusiasm was rather tempered when we opened the car doors and caught the first full smell of dead scallops baking under the Florida sun. Any of you who have visited a scallop dump know exactly what I mean. It's a smell you never forget, though oddly enough, as the season progressed, it became a positive experience, for the smell of dead scallops also meant there were other dead shells in the piles.

Still, the olfactory challenge was quite daunting at first, not to mention the thick clouds of flies that seemed to be everywhere. Between the odor and the drone of the flies, hundreds of which seemed to end up in our faces, well, you can understand why we had second thoughts about this particular adventure. To Margo's credit, she hung in there like a trooper, though she left it to me to dig in the actual scallop mounds while she combed the parking lot which was thickly layered with scallop shells. In fact, it was she who called to me to see what she had discovered: a bizarre-looking shell I had personally never seen before. It turned out to be a *Distorsio*, the animal still in the shell, and I could see the small operculum within. Though it was hardly a perfect specimen, I was pretty excited over our find.

During the course of our short time there (admittedly, the smell and the flies precluded our staying any longer), we found a number of other specimens, including *Neverita duplicata*, *Busycon sinistrum*, *Strombus alatus* and *Phyllonotus pomum*. Again, none were great specimens, but it had been many years since I had seen these shells in such quantity and size. Margo even made the find of the day: a small *Scaphella junonia* that was almost buried under a layer of scallop shells. Like the other shells we had found, it was far from being collector's quality, but it was only the second Junonia I had ever seen. In fact, we still have that particular specimen as a reminder of this amazing day.

Aside from our discoveries of other shell species, I was struck by the size of the Calico scallops we saw that day–much larger than any we had seen on Sanibel. They were also quite distinct in color and pattern. Had I not known that both were *A. gibbus*, I would probably have concluded that they were two separate species. We collected quite a few colorful single valves, but here and there I found some that were still in pairs; these I carefully tucked into separate bags.

Let me say right here that it was several days before we got the stench of those dead scallops our of our heads; the smell seemed to linger on long after we had showered several times.

Now those who know me know it would take more than the awful smell of rotting bivalves to keep me from returning the following week for another afternoon of searching out potential treasures among the countless scallop shells. Somewhere, I just knew there had to be some "keepers." And so, the very next Sunday, we headed for Apalachicola once more.

As we were passing through the small town of Carrabelle on Highway 98, Margo excitedly told me to stop. I looked back to see what had caught her eye. There on the side of the road were two fellows with a big table full of seashells, so we turned the car around and went back to see what exactly they had. Even from a distance I recognized a large *Cassis madagascariensis*. Was this possible? I knew the shell from my diving days in the Florida Keys during the late 1960's and early '70's, but I didn't think they were local.

As we pulled our car to a stop beside the little roadside display, I saw on closer inspection that these were not super specimens, but we were still pretty jazzed as we got out to look at what they had. The first thing that really caught my eye was what appeared to be an excellent *Scaphella junonia*. I got into a conversation with the two who introduced themselves as Chris and Fuzzy. It turned out that they worked there in Carrabelle, offloading the scallop boats out at a place called Timber Island. We ended up buying several shells from them, including the Junonia, a large *Busycon sinistrum* and the first *Tonna galea* I had ever laid eyes on. They were happy to be making some extra money from the "throwaways" associated with their jobs and told me to stop by the next week and they would try to get me another Junonia. Then we went on to Apalachicola for some more smelly shelling.

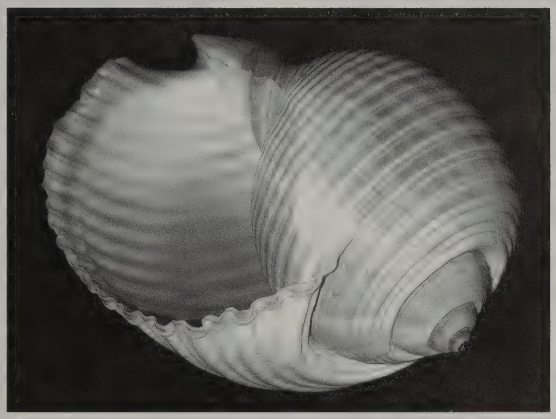
Fuzzy on the dock.

While we did make several more trips to the Apalachicola seafood processor and eventually got quite a handsome assortment of *A. gibbus* pairs, it wasn't until late in November that Chris and Fuzzy felt comfortable enough to invite me to Timber

Island to help them offload the scallop boats and search out the hidden treasures that came up with the scallops. And so, that Monday, I put on some old jeans, a faded sweatshirt and some sneakers that had been destined for the garbage, grabbed a couple of buckets and a few towels and headed off in the morning to help offload scallop boats. I was pretty excited, but at that point I still had no real idea of what was in store for me.

I arrived at the docks and made my way over to where I saw Chris and Fuzzy. The first thing I noticed was that there was mud everywhere. The next was that there was a huge crane dipping down onto the deck of a boat tied up at the dock, picking up a giant jawful of scallops and dumping them into an immense metal hopper. As I got closer, I saw that the scallops went into the hopper, then dropped down onto a short belt, then dropped again onto a long belt that stretched overhead on a track and eventually ended up in the processing room. Fuzzy motioned for me to hurry over. He said that this particular boat had been farther out and that he thought there might be some nice shells in with the mix.

I took up a position beside the belt which, let me tell you, moves quite rapidly towards the processing area. I saw lots of scallops, lots of mud, an occasional broken whelk or a crabbed tulip shell. I was literally getting dizzy trying to see if there were any good shells in the messy mix. And then I saw something that I can honestly say I will remember for as long as I am on this earth. Out of the hopper dropped a glistening creamy white shell with brown spots. It dropped onto the first short belt, then onto the long belt. I reached for it with what had to be shaking hands, because it almost shot past me and quickly would have been out of reach as the belt rapidly climbed to a height of nine feet or so. But I did manage to pluck it out and held in my hands the first live Junonia I had ever seen! If it wasn't for the fact that some other treasure might be ready to drop onto the conveyor, I would have stood staring at that shell for quite a while.



There were always specimens of *Tonna galea* coming up with the scallops, but most were severely damaged. A few, like this large one, were in very good condition.

I actually ended up spending about five hours working the line that first day. My take was impressive at the time: the Junonia, several small *Busycon sinistrum*, a handful of *Neverita duplicata*, quite a few unusually colored *Argopecten gibbus* (including several orange specimens), a four-inch *Hexaplex fulvescens* and a large *Tonna galea*. I had also seen many rather large fig shells (*Ficus communis*) go by, but, as they are very fragile, every one had been broken or all but smashed into pieces by the time it exited the hopper. I also saw several large Pear Whelks (*Busycon spiratum*) that had been severely damaged. I should also mention that by the time I left, I was nearly covered with mud and smelled like low tide.

On my way home, it happened to be minus tide (talk about having a good luck day) and I stopped at a spot that turned out to have a large population of *Melongena corona*, all of which were much larger than any I had ever seen. There was no question about it now: I was hooked! Shells had again, after a twenty year hiatus, become a passion.

Over the next three months, whenever time permitted, I would head down to the coast and work the lines offloading the scallop boats. It seemed that each boat carried with it an assortment of new and exciting finds. In addition, I was getting better specimens of each shell as time passed, so that I quickly amassed a large pool of shells for trading purposes.

During these months, certain boats would bring in huge *Busycon sinistrum* (many over 20 inches), but most were severely damaged by the time they got through the hopper–in fact, many of the larger shells would jam up the whole operation when something got stuck that was too big to slide out onto the belts. One boat carried at least a dozen *Cassis madagascariensis*, but again, all of these were severely damaged. Super size *Pleuroploca gigantea* were also fairly common, but in these cases, the shells were so badly eroded and damaged by marine growth as to be worthless, though Chris and Fuzzy sold them as plant hangers.

The interesting thing was that as the season progressed, I would see more of certain shells. By late January, Junonias were sometimes popping out two or three at a time, and in February, *Fasciolaria lilium tortugana* became rather common. In early March, large specimens of *Hexaplex fulvescens* were appearing with regularity. At the time, the operation was running two lines night and day and I would often find myself sleepless, thinking about all the shells I was missing.

One day in particular, we had quite a run of Junonias. I had at least a dozen in my bucket and Chris and Fuzzy were also grabbing what they could (though it pained me to watch them toss the shells into a box that was at least six feet away). I was carefully wrapping each of my shells in towels and was just coming back up to scan the line when Chris held up what had to be a six inch Junonia. "What do you think this is worth?" I was aghast! This was the largest specimen I had ever seen. I thought about how much I would offer him to let me have it when he spun it around to show me a large hole in the dorsum. "Does it hurt that it has a hole in it?" he asked. Oh, how that pained me! I told him that while it was certainly a huge specimen, the damage was so severe that it made the shell worthless as a collector's specimen. I still think about that shell and what I would have done if it had been perfect.

By the time the season began to wind down, I had collected over one hundred Junonias. To this day, one of the people working the other line claims he collected over two thousand! To my dismay, he had dumped them all in a vacant lot near Port St. Joe and by the time he started making them available, they had degraded so much from the decaying animal and the hot sun that the shells were almost worthless except as novelty items. To the best of my knowledge, they are still there.

One day, on the last weekend of March I drove over to Timber Island only to find the operation shut down and not a soul in sight. I walked around and finally poked my head into one of the offices in the main part of the processing building where I was told that operations had moved over to Port Canaveral because the boats were having to go so far out now to get the scallops that it was no longer profitable. What with fuel, insurance, payroll and such, each boat had to make two runs a day to make it worth the effort, and with the scallop beds so far out in the Gulf now, they could barely make it out and back in 24 hours, which mean barely breaking even or possibly losing money. I stood there with my empty buckets thinking I should have found more time to spend offloading the boats, but most people had thought the bonanza would last well into April.

Now, as I look back, I have many fond memories. When there were no shells to be found, I would toss any dead fish I saw to the eagerly

(Continued on page 17)

Greenhow Collection Donated to COA 2000 Auction in Houston

By Dave Green

Have you decided what you will do with your shell collection? How about donating it to the COA auction? That is what Edwin Greenhow of Tucson, Arizona did last year.

One morning early last March, in my capacity as chairman for the COA 2000 Auction in Houston last year, I received a call from Edwin asking for ideas on how to liquidate the shell collection of his deceased wife, Pauline. He proudly informed me it was an extensive collection covering most mollusk families. I asked Edwin to consider donating it to COA. He asked to know more about how COA utilizes money raised by auctions. I told Edwin COA makes annual educational research grants to individuals for scientific study in malacology and conchology. In addition, COA publishes a quarterly journal, *American Conchologist*, which goes to members around the world. Edwin decided Pauline would have liked her collection to be used for these valued projects and that he would donate it to COA. I thanked him for his decision and assured him the collection would make a difference in COA's commitment to support scientific research.

Then came the big question: how to move so extensive a collection from Tucson, Arizona over 1,000 miles to it's temporary destination at our home in Colleyville, Texas? Edwin sent photos of the collection so that I could get an idea of its size and content. The pictures showed this wasn't going to be an easy task, but Edwin said he had been in the shipping business at one time and could pack the entire collection and ship it to me. In a few days, boxes started arriving from Tucson. At first their arrival was slow, but they were packed extremely well. Edwin knew the packing and shipping business, all right. Then one day, eleven huge boxes arrived!

After unpacking Pauline's shells, we had to make the difficult decisions about which of her shells would go into the oral auction and which to the silent auctions. So many shells! In many cases, I decided to group shells into lots; in others shells would be sold as single items. Over the next two months, all my spare time was devoted to Pauline Greenhow's collection, but almost a year later, I can still say it was well worth the time and effort Lucille and I put into readying her shells for Houston's COA Auction 2000. As most of you know by now, we raised a record $22,000 plus at the Oral Auction. Edwin's donation made a huge difference in the final outcome!

Many COA members knew Edwin and Pauline Greenhow. Edwin was born in Kentucky, but moved to Colorado shortly after his birth. Fifth child in a family of seven, he was the son of a painter and interior decorator. In 1928, his father was seriously injured on the job and later died, during the Great Depression when times were hard. After the 10th grade, Edwin dropped out of school and got a job at Montgomery Ward.

Pauline "Polly" Greenhow was born in Lander, Wyoming. Her natural parents died in a flu epidemic and Susan M. Coates, a teacher, adopted Polly. They moved to Kiowa, Colorado in 1921 where Polly later graduated with honors from Colorado Women's College. Polly went to work for Montgomery Wards where she met Edwin, marrying him in 1938. After working in a defense plant during the war, Edwin he went to work for O.K. Tire Company, maker of tire recapping equipment. In 1950, they moved to Tucson where Edwin operated his own O.K. Tire Sales and Service Center until 1980. Polly worked as a nurse's assistant at a Tucson hospital and then for a doctor in private practice.

Polly collected shells for 25 years. She developed her interest in seashells while on a vacation to the West Coast. From that point on, Polly and Edwin combed the beaches and visited shell shops, collecting shells from San Diego to Vancouver. Polly's interest didn't stop at seashell beauty however; she studied all aspects of sea life.

Polly had many talents. She was very creative and was an excellent artist. She was also an excellent seamstress, designing, drawing patterns, and sewing all of her children's clothes. But best of all Polly's talents was that she was a wonderful wife and mother. Polly passed away in 1995. Thank you, Edwin, from the bottom of our hearts, for your support and generosity in sharing Polly's love of seashells with COA. We deeply appreciate your gift.

Lucinoid: A New Email Discussion Group

Because of recent discoveries and breakthroughs in understanding of the Lucinoidea, of their functional morphology and their ancestry, much recent bivalve study has focussed on these attractive bivalve mollusks. And because scientists are finding them so interesting, a new email discussion group has been formed. If you are attracted to these lovely lucines, you might like to lurk on this new list. To subscribe to the list send an email to: lucinoid-request@sbnature2.org In the body of the text include the word subscribe. Make sure your email is sent in plain text format, not in MIME or HTML format. For questions or problems, email Paul Scott at
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Mexican Malacological Meeting in September

The VIII Reunión Nacional de Malacología (VIII National Malacological Meeting-Mexico) VIII RENAMAC, is going to be held in Ciudad Victoria, Tamaulipas, México, September 25 to 28, 2001. The meeting is organized by Instituto Tecnológico de Ciudad Victoria and Mexican Malacological Society. Contact Dr. Alfonso Correa Sandoval, Instituto Tecnológico de Cd. Victoria, Tamaulipas. email : agutierr@rectoria.uat.mx For additional information:
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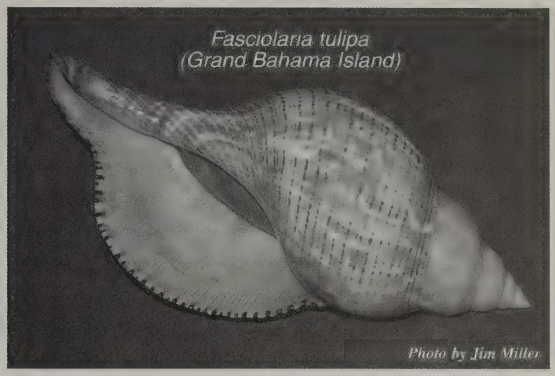

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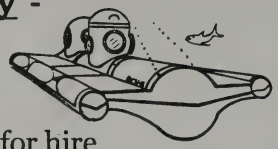

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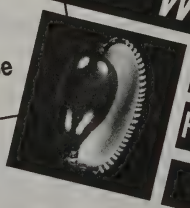

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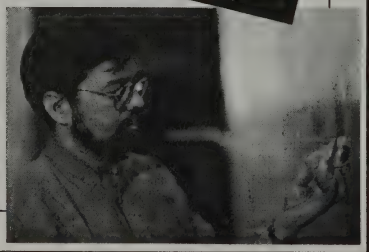

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SCUM V: SOUTHERN CALIFORNIA UNIFIED MALACOLOGISTS

By Lindsey T. Groves

Forty professional, amateur, and student malacologists and paleontologists met in the Times Mirror Room of the Natural History Museum of Los Angeles County for the 5th annual gathering of SCUM (Southern California Unified Malacologists) on Saturday, 20 January. As in previous years, SCUM meets informally to facilitate contact and keep members informed of research activities and opportunities. There are no dues, officers, or publications associated with this informal gathering.

SCUM V hosts George Davis and Lindsey Groves welcomed the gathering and opened the meeting with announcements of upcoming meetings and recent molluscan news. All attendees had an opportunity to present brief details of their current mollusk related research and/or activities (see below). Some presentations were more detailed than others, but numerous discussions and comments resulted. SCUM VI will be hosted by Dr. Eric Hochberg at the Santa Barbara Museum of Natural History in January of 2002.

Photo by George Davis
FRONT ROW: George Davis 2nd ROW: James McLean, Lindsey Groves, Carole Hertz, Carol Skoglund, Danny Yoshimoto, Kathy Kalohi, Jeff Tupen. 3rd ROW: LouElla Saul, Kristina Louie, Richard Squires, Hiromi Yoshimoto. 4th ROW: Carol Stadum, Scott Jordan, Daniel Geiger, Jules Hertz, Don Cadien, Eric Hochberg, George Kennedy, Lance Gilbertson, Phil Liff-Grieff, Scott Rugh. 5th ROW: Mary Stecheson, Hank Chaney, Bill Power, Larry Lovell, Kotaro Tsuchiya, John Ljubenkov, Roger Seapy. 6th ROW: Robert Stanton, David Jacobs, Hans Bertsch, Barbara Chaney. The following attended SCUM V but were not in the photo: Yvonne Albi, Doug Eernisse, Wes Farmer, Peter Marko, Bill Schneider, Nancy Schneider

SCUM V participants and their current interests and/or activities:

Yvonne Albi (Conch. Club Southern Calif.): Continues research on rudist bivalves and the bursid gastropod *Crossata californica* (Hinds, 1844).

Hans Bertsch (National University): Continues sea slug biogeography of the eastern Pacific including 2 news species lacking radulae. Current president of the Western Society of Malacologists; promoted attendance for the upcoming meeting in San Diego.

Don Cadien (L.A. Co. Sanitation District): California off-shore biological benthic surveys. Recently acquired deep-water material from Oregon State University surveys for analysis.

Barbara Chaney (Santa Barbara, CA): No report.

Hank Chaney (Santa Barbara Museum of Nat. Hist.): Continues research on Panamic and Isla del Coco mollusk species and collection development.

George Davis (Nat. Hist. Mus. L.A. Co., Crustacea): Continues management of LACM Crustacea Collection and preparing systematic list of crustacean taxonomy.

Doug Eernisse (Calif. St. Univ., Fullerton): In addition to teaching duties (Marine Biology, Evolution, Zoology), he continues research on chiton phylogeny, California limpet genetic sequences (with grad student Lisa Crummet) and animal relationships.

Wes Farmer (San Diego Shell Club): Has completed CD-rom of Torrey Pines State Park fossil fauna. Currently gathering additional images for a future edition.

Daniel Geiger (Nat. Hist. Mus. L.A. Co., Molecular Systematics Lab): Abalone identification guide (with Guido Poppe) and abalone biogeography paper (from PhD dissertation). Continues on-shore/off-shore analysis of vetigastropods. Will translate the catalog of Liechtenstein, 1794, a rare obscure German reference that includes species descriptions all of which may be suppressed.

Lance Gilbertson (Orange Coast College):Land snail studies, particularly reproductive anatomy of urocoptid and helminthoglyptid species of Arizona, New Mexico, and Texas.

Lindsey Groves (Nat. Hist. Mus. L.A. Co., Malacology/Inv. Paleo.): Cypraeid research, especially eastern Pacific taxa and the genus *Muracypraea* in the Caribbean and adjacent areas. Companion volume to Keen & Bentson's (1944) *Check List of California Tertiary Marine Mollusca* continues. Has started a survey of the fossil taxa of William More Gabb.

Carole Hertz (San Diego Shell Club/Editor *The Festivus*): Recently published *Panamic Province Molluscan Literature* as a supplement to volume 32 of *The Festivus*.

Jules Hertz (San Diego Shell Club/Business Manager *The Festivus*): No Report.

Eric Hochberg (Santa Barbara Mus. Nat. Hist.): Currently working with Kotaro Tsuchiya on unusual squids of California. Also studying population dynamics, reproductive strategies, and biogeography of California octopod species.

David Jacobs (Univ. Calif., Los Angeles): Continues studies of mollusk population genetics and analysis of on-shore/off-shore patterns of mollusks.

Scott Jordan (Pacific Shell Club): Interested in Recent and fossil Molluscan literature.

Kathy Kalohi (Pacific Shell Club): On a recent dive to a pinnacle known as *The Matterhorn* (between Santa Barbara and Anacapa islands) she became interested in comparing marine life on various off shore pinnacles of southern California.

George Kennedy (San Diego St. Univ.): Continues paleo-monitoring projects in northern San Diego County where numerous invertebrates and vertebrates have been recovered including many new records.

Phil Liff-Grieff (Pacific Shell Club): Interested in Recent and fossil mollusks especially land snails and the ecologic interactions of island endemic species.

Steve Lonhart (Univ. Calif., Santa Cruz): Dissertation research on the buccinid *Kellettia kelletti*, esp. ecological aspects of its range extension to Monterey Bay and its place in area feeding web.

Kristina Louie (Univ. Calif., Los Angeles): Continues population genetic analysis of eel grass specific mollusk species of California.

See the "color centerfold" on pages 26-27.

Larry Lovell (Scripps Inst. Oceanog.): Participated in benthic survey of Port Foster Bay, Deception Id. Antarctica, which included a polychaete dominated fauna. Mollusks included the bivalve genera *Laternula, Thracia,* and *Nuculana.*

John Ljubenkov (Pauma Valley, CA): Continues California off shore biological benthic surveys. Recent interest in 19th century literature on naturalists of California.

Peter Marko (Nat. Hist. Mus. L.A. Co.,Molecular Systematics Lab): Researching molecular phylogeny of the muricid genus *Nucella* and the transisthmanian species of arcid bivalves.

James McLean (Nat. Hist. Mus. L.A. Co., Malacology): After 37 years of dedicated service Jim has retired to devote his time to 2 long-term projects: A guide to the shelled gastropods of the North Pacific and a world-wide revision of the turbinid family Liotiidae.

Bill Power (L.A. Co. Sanitation District): No report.

Scott Rugh (San Diego Nat. Hist. Mus.): Curating collections of Cretaceous and Miocene invertebrate fossils. Strong interest Pliocene and Recent West Coast mollusks.

LouElla Saul (Nat. Hist. Mus. L.A. Co., Inv. Paleo. Res. Assoc.): Research on Cretaceous gastropod faunas with Richard Squires (CSUN), in particular *Nerinea* and *Volutoderma.*

Bill & Nancy Schneider (San Diego Shell Club): Continue their collecting activities of Pliocene mollusks at Santa Rosalia, Baja California, Mexico.

Roger Seapy (Calif. St. Univ., Fullerton): In addition to teaching duties, he is studying atlantid mollusks of the Gulf of California and pelagic snails of Western Australia (with Carol Lalli).

Carol Skoglund (Phoenix, AZ): Has recently published *Panamic Province Molluscan Literature: Additions and changes from 1971 through 2000. I Bivalvia. II Polyplacophora.* as a supplement to *The Festivus.*

Richard Squires (Calif. St. Univ., Northridge): Continues teaching duties (especially paleontology) and research on Cretaceous through Eocene mollusks.

Carol Stadum (Carlsbad, CA): Continues research with LouElla Saul on Miocene argonauts. Has recently completed working on *Fossil Reef,* a 1 acre Community Center Park in Lake Forrest, CA, that has utilized true and artificial rocks and fossils in the landscaping.

Robert Stanton (Nat. Hist. Mus. L.A. Co., Inv. Paleo. Res. Assoc.): Recently retired from Texas A&M University, plans to continue Pliocene molluscan research including distribution analysis and paleoecology of California species.

Mary Stecheson (Calif. St. Univ., Northridge): Is progressing with her M.S. thesis on the Cretaceous mollusks of Dayton Canyon, Simi Hills, Los Angeles, CA.

Kotaro Tsuchiya (Tokyo University of Fisheries): Visiting researcher at the Santa Barbara Museum of Natural History studying squid systematics with Eric Hochberg, a contributing author to the new book *Marine Mollusks in Japan* by T. Okutani (ed.), of which a copy was displayed.

Jeff Tupen (Morro Group): Recently began survey of the land snail *Rumina decollata* in San Luis Obispo County, CA. This introduced species has spread rapidly in some areas of California due to its commercial availability to combat the introduced pest species *Helix aspersa.*

Daniel Yoshimoto (Lost Coast Shell Club, Eureka, CA):Re-cataloging Robert Talmadge collection at Humboldt State Univ. Interested in species named for west coast Malacologists.

Hiromi Yoshimoto (Lost Coast Shell Club, Eureka, CA): No report.

(Miller article continued from page 11)

awaiting pelicans, fixtures there at Timber Island whenever a scallop boat pulled in. I found dozens of single valves of gloriously colored *Aequipecten muscosus*, though never a complete pair. They ranged from blood red through dark plum all the way to bright orange and lemon yellow. And some were huge! I recall an enormous Lion's Paw, a deep rich purple, dropping out of the chute, and I recall my excitement, until I realized it was a single valve. I also collected a fair number of *Sinum maculatum*, the uncommon relative of the Baby's Ear (*S. perspectivum*) and one large *Phalium granulatum.*

On the darker side, I also saw the terrible waste as huge skates and various rays were caught along with the scallops and discarded as unwanted byproduct. By the time the boats made it into port, they were all dead, and even if they had been alive, I doubt they would have survived being tossed into the muddy waters of the Carrabelle River.

For about a month after scalloping stopped, Margo and I would make the drive over to one or another of the scallop dumps we had eventually discovered. Occasionally we would find some worthwhile specimen: a dark brown *Oliva pattersoni* (what I believe is now known as *O. fulgurator*) or a fairly fresh Junonia. But we never had anything approaching the windfall of the scallop boat bonanza.

Rumor persisted for some time that the scalloping would start again towards the end of 1999, but the scallops remained so far offshore that it made no financial sense to go after them. Now they are saying it will likely be another three or four years until the Calico scallops come back to the Florida panhandle. When they do—and they will—you can bet I'll be there, ready to offload the boats and discover whatever jewels the sea chooses to send my way.

The 2001 R. T. Abbott Visiting Curatorship

The Bailey-Matthews Shell Museum is pleased to invite applications for the 2001 R. T. Abbott Visiting Curatorship. The Curatorship, established originally in accordance with the wishes of the late Dr. R. T. Abbott, Founding Director of the Shell Museum, is awarded annually to enable malacologists to visit the Museum for a period of a week. Abbott Fellows perform research, assist with the curation of the Museum's collection and provide a talk for the public. Fieldwork in southwest Florida can be arranged. The R. T. Abbott Visiting Curatorship is accompanied by a stipend of $1,500. For more information, contact Dr. José H. Leal, email: jleal@shellmuseum.org; phone: (941) 395-2233; fax (941) 395-6706. Applications must be submitted by May 15, and the award will be announced in late June.

The Nautilus Contents Online

Complete tables of contents of *The Nautilus* are now available online from volume 101 (1987) at shellmuseum.org/nautilus_ contents.html. This is an ongoing project led by Managing Editor (and Shell Museum web master) Tina Petrikas. Tina is adding the contents of a couple of volumes a week to *The Nautilus* site; make sure you check it frequently. *The Nautilus* is a non-profit malacological journal published by The Bailey-Matthews Shell Museum.

—Jose Léal, Editor, *The Nautilus*

CONCHATENATIONS

by Gary Rosenberg

Judging Shell Shows

The Philadelphia Shell Club started having competitive shell shows in 1994. As the show has grown and competition has increased, members have become increasingly interested in how judges make their decisions. The club president recently asked me to chair a committee to develop guidelines advising judges what we expect from them and giving members a better idea of what judges look for in exhibits. Our aims were to provide a more uniform standard for judging and to further increase the caliber of exhibits in our show. The committee's report was presented at the January meeting of the shell club in a round table discussion that proved lively and productive. The report and discussion form the basis of this article, fleshed out from some of my own experiences as a judge.

In many shows, the basis of judging is 100 percent judges' discretion. Other shows provide guidance to judges in the form of weights given to different aspects of exhibits. An article in the *Proceedings of the Philadelphia Shell Club* 1(8-9) in 1965, presumably by Dr. R. Tucker Abbott, suggested five basis areas of importance, which boil down to aesthetics, specimens, labels, educational value, and apparent effort. These areas were given different point values within a 100 point scale depending on the category: worldwide, regional, single family, etc. With the proliferation of categories in shows since then, it seems unwieldy to have a different scale for each category; one scale for all multiple shell exhibits and another for single shell ones seems more workable (Table 1). Also, effort in itself seems not be relevant: it is high praise to say that an athletic team won effortlessly. If "apparent effort" means completeness, neatness, or attention to detail, it can be judged within the other headings.

Multiple Shell Categories

If the main areas of aesthetics, specimens, labels and text, and educational value are given equal weight, each is worth 25 points. Point values might be specified for subareas within some of these (Table 1), but it proves impossible to give explicit point values for everything. For one thing, there are more than100 different kinds of mistakes that can be made. A finer subdivision would require more than a 100 point scale, which seems undesirable. In effect then, the point values serve as caps: no more than a certain number of points can be lost in one area. Different clubs may want to try different distributions of points depending on the relative emphasis desired for the major areas, for example, 20, 30, 30, 20. Experimentation will be needed to fine-tune the distribution of points within each area.

TABLE 1: SCORING SYSTEM FOR SHELL SHOWS

Multiple shell exhibits (100 points total)
- *Aesthetics*
  - Attractiveness: 20 points
  - Neatness: 5 points
- *Specimens*
  - Choice of specimens: 15 points
  - Completeness: 10 points
- *Labels and text*: 25 points
- *Educational value*
  - Clarity: 10 points
  - Scientific Accuracy: 10 points
  - Interest/Originality: 5 points

Single Shell Exhibits (100 points total)
- *Specimens*: 80 points
- *Display*: 20 points

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Aesthetics

First impressions count. Exhibits with aesthetic appeal attract viewers. Not only the shells contribute to attractiveness, but also their arrangement and surroundings. Labels, cases, backgrounds, and color schemes should complement the specimens, rather than distracting from them. Specimens should not be overcrowded nor too sparse. Labels should generally be uniform in size, type faces, borders and colors. Labels and other text should be in an easily readable font. Mixed cases are easier to read than all capital letters, which should be avoided except in titles and headings. Neatness is also important: smudges, loose ends, exposed adhesives, misaligned text and other minor sins can detract from an otherwise favorable impression. Minor sins cost one point, major sins two to five points.

Specimens

Shells are the focus of a shell show, so the best shells should count most in the judging. But what is "best" depends on the subject. Rare and desirable shells might be expected in an exhibit on volutes, damaged specimens in one about predators of mollusks, uncleaned shells in one about camouflage. Not all of the objects in exhibits are shells, but the same rule applies: exhibitors must choose the objects that best illustrate their subjects. Furthermore, exhibits must be entered in categories appropriate to their subjects.

Completeness is important. A more complete exhibit shows a greater range of taxonomic, morphological, and ecological diversity. Completeness must be judged on a percentage basis: omitting 10 of 200 cowrie species is equivalent to omitting 25 of 500 cone species. But it is not only a matter of percentages. In some families it is more difficult to reach a given degree of completeness than in others. In an exhibit on a geographic area, missing classes, families or genera are more important than missing species, and lack of species from particular habitats might also be considered. Such alternate measures of diversity should also be considered if the maximum length of exhibits in a show constrains how many species can be displayed.

Showing variety within a species also matters. This includes presenting dorsal and ventral views, exterior and interior with bivalves and chitons, and variation in color, pattern, size and shape. Variety should be presented thematically: a single specimen with periostracum doesn't add as much as showing a number of species with and without periostracum. Juvenile shells can be displayed, but generally should be dead-collected, unless they are by-products of a fishery or a collecting technique such as dredging that does not allow one to avoid taking live juveniles.

Labels and text

For simplicity, all errors in text, be they on backboards or specimen labels, are grouped together here. There are many different ways to make mistakes in text. Some of them have been around since the invention of the printing press, others have been popularized by the computer. Each different mistake should result in the loss of at least one point, but specifying point values for each kind of mistake is not feasible. Too much depends on context: a typo in the title is worse than one in the text. As with aesthetics, a scale of one point for minor sins and up to five points for major sins provides more flexibility. In the category of major sins are:

Misidentification

Impossible locality data

All misidentifications are not created equal. Being unaware that a specimen is a member of a species named last month warrants less penalty than misidentification of a juvenile *Strombus* as a *Conus*. Three misidentifications out of 20 species are worse than three out of 200. Similarly, impossible locality data is more egregious for a self-collected than a purchased specimen. However, impossible data due to switched labels within an exhibit is more forgivable, and falls farther

down the ladder of errors:

Switched or missing labels or captions
Outdated name (e.g., synonym or wrong genus)
Label not clearly associated with specimen
Consistent misspelling of a name
Incorrect or missing author or date

Finally come trivial errors of the sort that typically reflect a momentary lapse in concentration, although the first four below could also signal unawareness of typographic conventions for species names. In general, no more than 10 points should be taken off in total of all such errors; however, rampant typographic errors might also affect the aesthetic value of an exhibit.

Capitalizing specific name
Incorrect use of parentheses
Omitting comma between author and date
Failure to set off species names (italics, bold or underlining)
Typographical error

In addition, judges might want to consider the overall adequacy of locality data for specimens, particularly in self-collected exhibits. The occasional specimen with sketchy locality data should not be penalized, as this would only provide a temptation to embellish.

Educational value

Clarity, accuracy and interest are the essential ingredients of educational value. Clarity consists of focus, organization, and integration; scientific accuracy of even-handedness, completeness and precision. Interest combines informativeness, originality, and memorability. These many elements can be contradictory (e.g., focus vs. completeness) and balancing them is part of the craft of creating an effective exhibit. The end result should be that the viewer learns something and remembers it.

The essential starting point is careful choice and execution of subject and themes; focus brings clarity. Themes should integrate to show patterns: each part of the exhibit must relate to the whole. There is no single right way to organize an exhibit. One model is found in science fairs, in which case the parts would be summary, introduction, materials and methods, results, discussion and conclusions.These need not have explicit headings; materials and methods might merge with introduction, the specimens themselves might be the results, and conclusions might be just the final paragraph of the discussion. Another model is the newspaper article, with its pyramid of increasing detail. A more novel model might be a playbill with the species as the cast of characters.

Whatever the model of organization, there should be a section that states the goals, scope, and conventions of the exhibit and defines terms as needed. This section would include explanations of how the specimens are arranged, be it alphabetically, systematically, ecologically, thematically, or by some combination thereof, and of how self-collected specimens are indicated. If there are conflicting opinions or classifications in the scientific literature, it should be clear why the exhibit follows one rather than the other. Reliance on primary rather than secondary sources is preferable. If an exhibit attributes particular pieces of information to particular sources, a "References Cited" section is appropriate; otherwise, general "Sources of Information" should be given. A standard bibliographic format should be followed.

Illustrations can enhance any exhibit. These might be diagrams showing parts of a shell, distribution maps, or pictures of live animals or habitats. Ideally permission to reproduce copyrighted material should be sought and acknowledged and, at a minimum, sources of such must be cited. Even if an illustration is modified, its source should be cited, as "adapted from...." To avoid revealing the exhibitor's identity to the judges, original illustrations should be credited to "the exhibitor," or perhaps be flagged in the way that self-collected specimens are.

Interest and originality are easy to recognize, but hard to quantify. Which exhibits are the most memorable? What made them different? Probably a different approach, an unusual subject, slicing obliquely to reveal new facets. But there is another way to be original: take the usual subject and explain it better. Imagine an exhibit on *Spondylus* that made explicit the characters distinguishing the species rather than just showing an incredible array of spiny oysters. Originality means going beyond what is written in the books and synthesizing something new.

Single Shell Categories

Judging single specimens is highly subjective, since comparisons are usually made among species, not within them. Is a spectacular specimen of a common species "better" than an average specimen of a rare species? Shells like the coquina, *Donax variabilis*, are so abundant that a person could collect millions of them if desired. Others, such as *Conus primus*, are known from only a handful of specimens. The average size or condition of a rare species might not even be known. When stuck making such a decision, I ask myself, which specimen would I most want for the museum's collection? The answer usually is that I prefer rarity of the species: I'd rather acquire a species that we don't have than add a better example of one that we do.

As shown in Table 1, the specimen is foremost in single shell exhibits. The 20 points allocated to display encompass the areas of aesthetics, label and text, and educational value. Surprisingly often, exhibitors ignore aesthetics in this category. A padlock front and center or an overly ornate container detracts from the specimen. Under the heading of label and text, correct identification, spelling, formatting, and locality data matter. Educational value comes from stating what makes the exhibited specimen noteworthy or giving brief biological or historical information about the species.

Is it Practical?

Is it possible for judges to give a numerical score to every exhibit in the short time available for judging most shows? Will such scores lead to more second-guessing or less? I don't know. I think that, used appropriately, a scoring system can be an effective tool for assigning *relative* scores within a category, especially when close decisions need to be made. The system will not yield *absolute* scores: a 90 in a educational category will not mean the same thing as 90 in a single species category. Therefore the scores are not appropriate for use in deciding major awards.

Assuming a show has more than one judge, I picture the judges scoring the four main areas based on their overall impression, then averaging their totals to get the score for an exhibit. It doesn't matter if one judge gives 70 points and the other 80, as long as they agree on the relative placement of exhibits as first, second, third, etc. When the judges disagree on the order or are uncertain, then they might resort to more detailed scoring of subareas and tallying individual errors.

There will always be cases that don't fit readily into a point system. What should be done when there are two species in an exhibit in a single species category, or shells larger than allowed in a miniatures exhibit? The rules of the show should state whether exhibits that violate the rules of their categories are disqualified, ineligible for a blue ribbon, or merely penalized as the judges see fit.

A frustrating part of judging is that most exhibitors do not take the opportunity to talk to judges and find out how their exhibits might be improved. No exhibit is perfect, nor is any judge. Those who ask, even if they start out being upset about a loss, are usually satisfied when they get an explanation. This doesn't necessarily mean they agree with the decisions, but they feel that their exhibit was given due consideration. With a few upgrades to the exhibit and a fresh set of judges at the next show, they might emerge victorious.

Acknowledgements

I thank committee members Harry J. Berryman, Richard Y. Kirk, and Jere Price for their help in the development of these guidelines, and Lois Kucker, president of the Philadelphia Shell Club and the many club members who contributed their ideas.

THE OLD SHELL GAME

by Paul Monfils

Much Ado About Data

So many wonderful memories of days at the shore, searching for colorful shells with Aunt Mary. What an incomparable thrill, finding, at the age of eight, my first Northern moon snail, a monstrous creature, twice the size of my fist! The many pleasant summer afternoons cleaning shells at her kitchen sink, and finally, watching her gently set each newly acquired treasure into its place of honor in the big glass cabinet next to her dining room table! Those shells provided her, and me, with uncounted hours of sheer delight. Aunt Mary is gone now, and her collection has occupied a dark, seldom-visited corner of my basement for several years. At last, I decide that donating her life's work to the local museum would constitute a fitting tribute to my dear aunt's memory. I called the curator and he agreed to visit my home and view the collection. Imagine the letdown when he told me he could not accept my offer! The shells are of no use to the museum! Why? Because they are not accompanied by any data of scientific value. A museum collection, he kindly explains, is first and foremost an assemblage of information, and not just pretty objects.

Of course, scientific institutions are not the only places where collection data is valued. Many serious amateur collectors likewise desire specimens with accompanying data. That pretty snail you discover crossing the driveway after a rainstorm, or the handful of algae-covered periwinkles that little Bobby brought home from the beach in a paper cup have the potential of contributing in some small way to the collective fund of malacological knowledge—but only if the facts associated with the collection of the specimens are preserved along with the shells.

What data should be recorded for a self-collected specimen? The most essential bit of information is, of course, the locality where the specimen was collected, recorded as accurately and specifically as possible. An ideal description is one which will enable another person to easily locate the actual collection site. "Northeastern U.S.A." is not useful data, from a scientific perspective. "Cape Cod, Massachusetts, U.S.A." is an improvement, but is still too general to have much practical value. "Barnstable Harbor, north shore of Cape Cod, Massachusetts, U.S.A." is typical of locality data accompanying most shells purchased from specimen shell dealers, or obtained by trading with other collectors, and is usually considered adequate for general use; but it could be improved considerably. A thorough description might read, "north side of Barnstable Harbor, north shore of Cape Cod, Massachusetts, U.S.A., 200 yards west of the first breakwater". Having this data in hand, another interested party would be able to locate, within a few yards, the actual site where the specimen was originally found.

In describing localities, avoid using non-permanent reference points. "100 meters east of the seawall" is good—a seawall is a relatively permanent structure. "On the beach behind Mike's Bakery" is not good. By next year, Mike's Bakery might be Bill's Auto Parts—or it may have burned down, or been washed away in a hurricane.

Another essential piece of information is the type of substrate on which, or in which, the specimen was found. General terms like "sandy", "muddy" and "rocky" are commonly employed, and do provide useful basic information, but a bit more descriptive detail could make the data more interesting and more valuable. Give some attention to the characteristics of the substrate itself—its color, texture, and uniformity.

"In sand" might be expanded to:

- in slightly silty, coarse-grained, yellow-brown sand
- in clean, fine, white coral sand
- in muddy sand, intermixed with gravel

"On rocks" might become:

- on exposed, wave-washed surfaces of black basalt outcrop
- low on the seaward side of huge (2 meter diameter) barnacle-encrusted granite boulder

Obviously, some minimal exposure to geological terminology could be helpful here. If the specimens were collected on vegetation (either marine algae or, in the case of land snails, various terrestrial plants), the identity of the vegetation is an important fact to record. So, a bit of botanical lore can be useful too. Terms like "seaweed", "kelp", and "sea grass" are in the same category as "turret shell" and "cockle" —vernacular terms that may have different meanings in different localities. It is a rare shell collector who can identify even local algae to the species level; but it doesn't take too much effort to familiarize yourself with the common genera of larger marine algae occurring in your collecting area. A notation that a particular snail was found on *Ascophyllum* seaweed says a lot to someone familiar with marine fauna and flora, since they can immediately visualize the type of rocky, cold water, wave-washed habitat in which *Ascophyllum* grows. If you don't know the name, you can take a small sample of the vegetation for later identification, or at least describe it in general terms (yellow-green, slimy seaweed with small balloon-like swellings on the stems; five-foot, woody shrub with smooth gray bark and slender, shiny, 3-inch leaves, with finely toothed edges and fuzzy undersides). Such a description may not provide an absolute identification of the host plant, but it will at least eliminate many forms, and greatly narrow the possibilities.

For aquatic species, water depth is an important component of collection data. For specimens taken subtidally, by diving, dredging, or trapping, the depth should be measured as accurately as available means will allow. An electronic fathometer is great, if you have one—but a rock tied to a length of fishline can provide a fairly accurate measurement in a pinch. Scientists generally use the metric system, expressing linear measurements in meters or centimeters; however it makes little difference whether you record your data in meters, feet, or fathoms, since one readily can be converted into the other. When specimens are taken intertidally, or in wading-depth subtidal areas, the tidal level at the time of collection should be noted. The notation "under a rock in 3 inches of water" doesn't tell the whole story, because the respective high tide and low tide positions of "3 inches of water" may be separated by a considerable distance—in some localities by hundreds of yards. Collection locations for specimens found intertidally may be described in terms of their horizontal distance above the low tide line, or below the high tide line; or by indicating lower, middle, or upper intertidal zone.

Such descriptions are not really complete though, unless the date of collection is also indicated, since tidal ranges can fluctuate greatly in a given locality, depending on the phase of the lunar cycle. Collection dates are also useful in a more general sense. Knowing where a specimen was collected has limited value if you don't know whether it was collected 2 years ago or 20 years ago. Also, a general statement regarding the time of day can be useful (early morning, late afternoon, at night) since the nocturnal habits of many shallow water marine organisms are quite different from their daylight activities.

Also recommended is a notation indicating the physical orientation of the specimen to the substrate. Again, the eventual value of the data depends on the thoroughness of its initial recording. Was the animal lying passively on the sand? actively crawling on it? buried in it? burrowing beneath its surface? If buried, was it half buried, or fully buried? If fully, how deep in the substrate? "Found under a rock in shallow water at low tide" sounds like an adequate description, but—was the mollusk attached to the underside of the rock? or lying on the sand under the rock? or buried in sand under the rock? Such specifics of course may not be available for shells dredged in deep water.

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However, for specimens taken by shore collectors and divers, such habitat notes are easy enough to record, and will have lasting value. Indeed, at the time of collection, habitat notes are far more essential than correct identification of species. The latter can be done later—even years later—by anyone with access to appropriate reference materials. However, collection data is a one-shot deal. Either it is accurately recorded by the collector at the time of collection, or it will never be known by anyone. For that reason, it is advisable to carry a small field notebook, wherein relevant facts can be jotted down. Some memories are better than others, if I remember correctly, but no memory is perfect. Therefore, getting the facts recorded in the field makes for more reliable data.

There are, of course, many other facts that could be recorded, and some collectors may consider some of these details important. Also, for certain types of scientific studies, additional data may be essential. Such information might include water and air temperature; general weather conditions; wave action; speed and direction of prevailing currents; salinity; relative abundance and distribution of the species collected; physical relationship to other species; etc. But, paperwork doesn't rate highly on most people's lists of favorite activities, and most collectors would prefer not to write a major treatise on every specimen they collect. So, basic data, carefully and thoroughly recorded, is all that can reasonably be expected in most cases, and that will be sufficient to ensure that the specimens which provide us with so many gratifying moments today will have lasting scientific value, and maximum interest for anyone placing the shell in his/her personal collection, today, tomorrow, and beyond.

Book Review:

A conchological iconography [delivery 3] The family Ficidae by Marcel Verhaeghe and Guido T. Poppe. *ConchBooks, Hackenheim, Germany. pp. 1-31 with numerous b&w text figures + 27 color plates. 210 x 295 mm. Loose-leaf, four perforations, dedicated binder available. ISBN 3-925919-27-9 (masterwork); 3-925919-30-X [this delivery], 2000.*

See reviews of delivery 1. ***The family Harpidae*** *of this masterwork by Patty Jansen and by Richard E. Petit [American Conchologist 27(2):30; 30-31. Sept., 1999 and delivery 2.* ***The family Strombidae*** *by Harry G. Lee [American Conchologist 28(1):11. March, 2000].*

This is the third issue (the term "delivery" is put to use by the directors and editor) of a series of monographs produced by "directors" Guido Poppe and Klaus Groh and edited by Conchbooks (sometimes rendered ConchBooks). Like its predecessors, it is amply and beautifully illustrated in color, and this feature places it among the very best modern works of its kind.

The introductory text is organized into brief but illuminating passages dealing with the systematics, conchology, fossil record, habitat, morphology, general biology, history/anthropolgy, and acknowledgements (no less than twenty-one individuals cited). The authors are quick to acknowledge the only major barrier to our understanding of the taxonomy of the family is the proper identification of its type species, *Ficus communis* Röding, 1798 [by subsequent designation (Dall, 1906), which work I could not find in this bibliography or by any other means; the tautonymic *F. ficus* (Linnaeus, 1758) is, obligingly, a senior subjective synonym (Röding, 1798)]. This point is well-taken and represents a fundamental dilemma which has received attention from workers in the past. We shall return to this topic in the discussion below. Included is a single page "Systematic Arrangement," which allows us to get a preview of the thirteen taxa [a single *Thalassocyon* (an obscure bathyal relative), nine species of *Ficus*—one with three subspecies and a "form"]. Unlike earlier "deliveries," there are no gender-bending name combinations (*Ficus* is a *rara avis*, a second declension feminine noun with a *-us* termination; another noteworthy, but somewhat less tricky feminine genus is *Venus*, representing the third declension); all adjectival trivial names agree in gender! But, alas, the gremlins recurred as five instances of errors with parentheses (here rendered correctly): , *F. variegata* Röding, 1798, *F. dussumieri* (Reeve, 1847), *F. laevigata* (Reeve, 1847), and *F. reticulata* (Reeve, 1847).

The taxonomic treatment follows; each taxon having type, type locality, range, habitat, dimensions, description and comparison, animal (when known), and remarks fields formatted. Each has a fine pair of thumbnail images depicting dorsum and ventrum of the shell. While there is scanty comparative discussion and an alarming lack of information on types (for which the authors cannot be held fully responsible), this section serves well. Lumping of *F. howelli* Clench and Aguayo, 1940 and *F. atlantica* Clench and Aguayo, 1940 under the earlier synonym *F. pellucida* Deshayes, 1856 and arranging *F. papyratia* into three allopatric subspecies strikes me as reasonable; the discussion and illustrations are supportive.

The only real detraction in this section, and it harkens back to the fundamental type species concept, is the failure to define four important taxa: *F. ficus* (Linnaeus, 1758), *Ficus communis* Röding, 1798, *F. ficoides* (Lamarck, 1822), and *F. subintermedia* of authors [not of (d'Orbigny, 1852); a fossil taxon, presumed extinct]. Each of the taxa is mentioned in the introduction in a manner suggesting the reader knows its identity, but the truth is that essentially nobody does. Before anyone can deal with this species or group thereof, the Museum Boltenianum, the Linnean collection, the Lamarck material, and doubtlessly other resources have to be scoured. Lectotypes or neotypes must be designated and illustrated. Only then will there be a foundation for a sober analysis of this "collectable" [sic] genus, which belies its manageable diversity by providing a head-spinning array of confusing species depictions in the literature. Verhaeghe and Poppe, to their credit, acknowledged the problem; it was just beyond the scope of this work.

The bibliography has over 90 entries—far exceeding those of previous deliveries, especially for such a small taxonomic unit. Regrettably the work of Dall and of Jutting, each pivotal to the underpinnings of the taxonomy, were omitted.

There follows a succession of color plates on black background which are certainly the finest renderings of this family ever assembled in a single work. Close-ups of the fine sculpture are helpful in some species distinctions. The apical views convince me that the protoconchs are indistinguishable.

This is the best-executed of the issues comprising the masterwork *A conchological iconography*. Anyone with an interest in the Figsnails and their shells should order this **special delivery**.

Delivery 3 is available from several U. S. dealers at $28.00 (30 Euro); special binder (commodious enough to store about three volumes but below the standard of *Indo-Pacific Mollusca*) at $13.00. Future volumes are expected soon; topics include the Acavidae (in part), *Calliostoma,* Neritidae, etc. European customers may wish to contact the publisher, ConchBooks, Mainzer Str. 25, D-55546, Hackheim, Germany. <conchbooks..conchbooks.de>.

—Harry G. Lee

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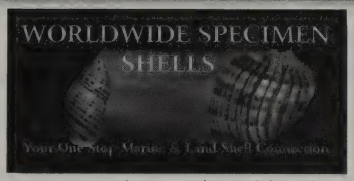

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FAMILY: FICIDAE

by Tom Eichhorst

Ficids in General

Every shell collector knows this small family, but few collections have more than one or two of these interesting shells. The name *Ficus* means "fig" and is obviously based on the shell's fig shape (a synonym is *Pyrula* Lamarck, 1798, referring to a pear, which is similarly-shaped). The family Ficidae is well established in the fossil record at least as far back as the Eocene (40 to 70 million years ago) and is represented in Recent times by as few as 10 species according to the latest work by Verhaeghe and Poppe (2000), with an additional 5 subspecies and forms. The shell has a large, inflated body whorl with a short spire. Fine spiral ridges and occasionally intersecting axial ribs give the surface an appearance of small, square, window-shaped structures. The aperture is long and wide with a thin outer lip. The columella is smooth and the siphonal canal long. There is no operculum in the genus *Ficus*, but the genus *Thalasscyon*, presently included in the family, has an operculum. The Ficidae range in size from the small *Ficus eospila* (Péron & Lesueur, 1807) at 50 mm to the large *Ficus gracilis* (G.B. Sowerby I, 1825) at 150 mm. They are thin, seemingly fragile shells, yet when this lightweight, fragile shell is found washed up on the beach, it is often intact with no discernible damage.

In life, two mantle lobes similar to those found in *Cypraea* cover the shell, and the animal crawls on a large and often very colorful foot. Some authors (Abbott and Dance in the *Compendium of Seashells*) have speculated on a degree of sexual dimorphism in shell structure, pattern, or coloring, but this has yet to be established. Most fig shells have little or no pattern and are colored in shades of brown. Figs are carnivorous, feeding on sand dollars, sea urchins, sea cucumbers, and bivalves. They are typically found on sand or coral rubble in shallow to deep water in tropical seas, and are most common in Indo-Pacific and Caribbean waters. The shells of the shallow water dwellers are often beached.

Like other gastropods, members of the Ficidae hatch from the egg into a larval stage. The protoconch is oligospiral and bulbous which would indicate a brief free-swimming veliger stage or even direct development into "crawl-away" juveniles. The lack of a long-lived veliger stage means the animal is not as prone to become widely dispersed. This regional isolation or vicariance is a classic set-up for speciation, wherein each isolated population may diverge by natural selection. This gives rise to endemic *Ficus* populations that are clearly related but considered separate species or subspecies. The difficulty for the collector comes in trying to identify and differentiate these look-alike species, subspecies and forms. Even though this is a small family, there are still a number of problems with basic identification and determination of species status.

The Name Game

The first valid usage of the genus *Ficus* was *F. communis* Röding, 1798, and it was designated as the type species by Dall, 1906. However, Winckworth, in 1945, designated *Ficus ficus* (Linnaeus, 1758) as the type species. He considered *F. communis* to be synonymous with *F. reticulata* Lamarck, 1822 and ineligible for type status. Dodge (1955), in his review of Linnaean mollusks, agreed with Winckworth and listed *ficoides* as a form of *F. ficus*. According to Abbott and Dance there is no species that can be reliably identified as Linnaeus' *Ficus ficus* (named by him as *Murex ficus* in the 10th edition of *Systema Naturae* in 1758 and *Bulla ficus* in the 12th edition in 1767). It seems his original description may have been a composite of three different species. Abbott and Dance indicate *Ficus variegata* Röding, 1798 as the most likely candidate for the Linnaean shell, and this is often the species sold by dealers as *Ficus ficus*. This centuries old problem is addressed in the most recent work on the Ficidae, *A Conchological Iconography*, "The Family Ficidae" by Marcel Verhaeghe and Guido T. Poppe, 2000. This is the first modern treatment of the entire family and contains a number of taxonomic changes as the authors attempt to draw together conflicting and contradictory research material. Admitting that more research is needed and that there are undoubtedly species they have missed, the authors made three major changes in the previous taxonomy.

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The well-known species many have called *Ficus communis* (Röding, 1798), found from North Carolina to the Gulf of Mexico, is called *Ficus papyratia* (Say, 1822). This action is taken to clear up confusion between *F. communis* and *F. ficus*. This name revision was originally authored by Pilsbry, who designated a neotype for *F. papyratia*. Although validated by Clench in 1942, subsequent workers, including Dodge in 1955 and more recently R. Tucker Abbott, persisted in the application of the Röding name to the western Atlantic species. Clench, in fact, does not even mention *F. communis*, apparently considering it synonymous with *F. ficus*.

The second change involves the popular west Atlantic *Ficus howelli* Clench & Aguayo, 1940 and *Ficus atlantica* Clench & Aguayo, 1940. Several recent authors considered these two deep-water species as synonymous with the single name *F. howelli* and maybe even male (*F. howelli*) and female (*F. atlantica*). Verhaeghe and Poppe went beyond this merging of the two forms by also changing the name from *F. howelli* to *Ficus pellucida* Deshayes, 1856. This was done because the figure for *Ficus pellucida* used by Deshayes matched *F. howelli* in everything but size. Deshayes gave a size of 70 mm—a bit larger than normally accepted for this species.

The third major revision by Verhaeghe and Poppe is to drop the name *Ficus subintermedia* d'Orbigny, 1852, a name originally given to a fossil shell, in favor of *Ficus ficus* (Linnaeus, 1758), a name in search of a shell. They state this extremely variable species should probably be split into separate species, but presently, research is lacking to support this action. Thus *F. ficus* includes as synonyms the previously well-known *F. subintermedia* and the Red Sea form, *F. ficoides* (Lamarck, 1822).

Pacific Ocean, Indian Ocean, and Red Sea Ficidae

There are eight Ficidae found in the waters from the west coast of the Americas through the Japanese Islands and the Philippines to the east coast of Africa. Four of these species can be rather difficult to differentiate. The first of these troublesome shells is the aforementioned *Ficus ficus* (syn. *F. subintermedia* of authors and *F. ficoides*). This species is found from the Red Sea (form *ficoides*) and South Africa to Fiji, Australia, the Philippines, and as far north as Japan. It looks somewhat like *Ficus variegata* Röding, 1798 (they share the same range) and may indeed be a form of this variable shell as thought by Abbott and Dance. Whatever the actual status, the differences are worth noting. *Ficus variegata* is almost twice as heavy, size for size, as *Ficus ficus*, it often has a more intricate pattern and more of a surface gloss, and the junction of the outer lip with the body whorl at the posterior canal forms almost a 90° angle. The same junction in *Ficus ficus* forms hardly any angle, and the outer lip meets the body whorl at the posterior canal at almost the same angle as the body whorl. Additionally, the aperture of *Ficus variegata* is a dark chocolate purple-brown while that of *Ficus ficus* is light-cream colored with a lavender overcast. All of these differences tend to be a bit less evident as you travel eastward in the range of the two shells.

The rest of the Pacific Ficidae are easy to identify. *Ficus eospila* (Péron & Lesueur, 1807) from west Australia is a very small fig with a regular series of widely spaced brown spots in six spiral rows. It should not be confused with *Ficus pellucida* (syn. *F. howelli* and *F. atlantica*), which is an Atlantic shell with finer sculpturing and less regular spotting. *Ficus gracilis* Sowerby, 1825 is a large, slender fig with heavy spiral ridges and axial ribs that are small and almost completely hidden by the spiral ridges. It is brown with darker brown, axial markings and has an Indo-Pacific range. The rare *Ficus investigatoris*

Pacific Ocean, Indian Ocean and Red Sea Ficus

1. *Ficus ficus* (Linnaeus, 1758) (Syn. *F. subintermedia*) Philippines (86 mm)
2. *Ficus ficus* (Linnaeus, 1758) (form *tigris*) India (58 mm)
3. *Ficus ficus* (Linnaeus, 1758) (form *ficoides* Lamarck, 1822) Red Sea (56 mm)
4. *Ficus variegata* Röding, 1798 Vietnam (88 mm)
5. *Ficus eospila* (Péron & Lesueur, 1807) Australia (42 mm)
6. *Ficus variegata* Röding, 1798 South Africa (52 mm)
7. *Ficus filosa* (G.B. Sowerby III, 1892) Vietnam (87 mm)
8. *Ficus investigatoris* (E.A. Smith, 1906) India (93 mm)
9. *Ficus gracilis* (G.B. Sowerby I, 1825) Philippines (159 mm)
10. *Ficus ventricosa* (G.B. Sowerby I, 1825) Pacific Panama (93 mm)

Atlantic Ocean and Caribbean Sea Ficus

11. *Ficus papyratia papyratia* (Say, 1822) (Syn. *Ficus communis* (Röding, 1798) Florida (78 mm)
12. *Ficus papyratia carolae* Clench, 1945 Honduras (85 mm)
13. *Ficus papyratia lindae* Petuch, 1988 Venezuela (80 mm)
14. *Ficus papyratia villai* Petuch, 1998 Nicaragua (89 mm)
15. *Ficus pellucida* Deshayes, 1856 (form *howelli* Clench & Aguayo, 1940) Cuba (52 mm)
16. *Ficus pellucida* Deshayes, 1856 (form *atlantica* Clench & Aguayo, 1940) Colombia (49 mm)

17. Artist's Conception of the New Zealand *Thalassocyon bonus* Barnard, 1960

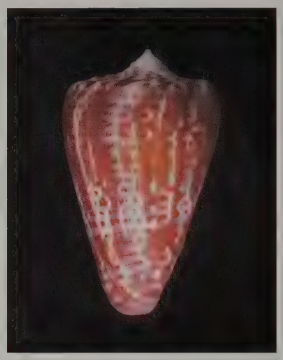
(Continued on page 31)

Conus spurius Gmelin, 1791 complex of the Tropical Western Atlantic

Specimens from the collections of: Kevan & Linda Sunderland and Harlan E. Wittkopf
Photos by Kevan & Linda Sunderland

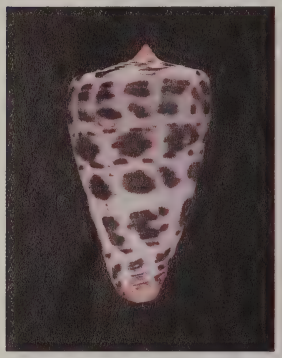
Taken by fisherman, 70', offshore banks of Honduras. 70 mm.

Taken by fisherman, 70', offshore banks of Honduras. 71 mm.



Taken by fisherman, 70', offshore banks of Honduras. 58 mm.

Off Sanibel Island, Florida. 50 mm.



Taken by shrimper from 120', Gulf of Venezuela. 55 mm.

Off Sanibel Island, Florida. 64 mm.

Taken by diver, 60', in sand, off Plantation Key Florida. 97 mm.

Taken by diver, 30' in turtlegrass, North coast of Grand Bahama. 64 mm. Ex- Bob Quigley collection

Taken by diver, 120 in sand and turtlegrass, off Provo Island, Turks & Caicos. 55 mm.

Taken by shrimper, 225', Gulf of Campeche, off Contoy Light, Mexico. 49 mm.

Taken by diver, 20' in sand and turtlegrass, Discovery Bay, Jamaica. 67 mm.

Taken by diver, 19', in sand and turtlegrass, La Pauaga, Puerto Rico. 77 mm.

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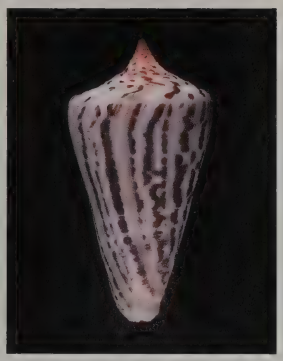
The intent of this feature is not necessarily to distinguish valid or invalid species, but to provide illustrations of taxa not always popularly available, for the information of the collector.

Taken by snorkeler, 10', in sand and turtlegrass, South coast of Dominica Republic. 49 mm.



Taken by shrimper, 130' in rubble, Caribbean Panama. 67 mm.

Taken by fisherman, 130', off Isla Margarita, Venezuela.62 mm.

Taken by shrimper, 220', in rubble, Gulf of Venezuela. 63 mm.

Taken by shrimper, 170', off Santa Marta, Colombia. 55 mm.

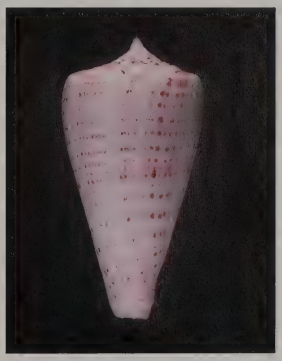
Taken by fisherman, 30', in sand & rubble, San Andres, Colombia. 49 mm.

Taken by shrimper, 170', off Colombia.48 mm.

Taken by shrimper, 225', in rubble, off Morrosquillo, Colombia. 51 mm.

Taken by shrimper, 120', in muddy sand, North coast of Honduras. 68 mm.

Taken by shrimper, 225', in rubble, off Morrosquillo, Colombia. 27 mm.



Taken by fisherman, 140', in rubble, Caribbean Panama. 61 mm.

Taken by scallop boat, 170', off Appalachicola, Florida. 78 mm.

REFERENCE

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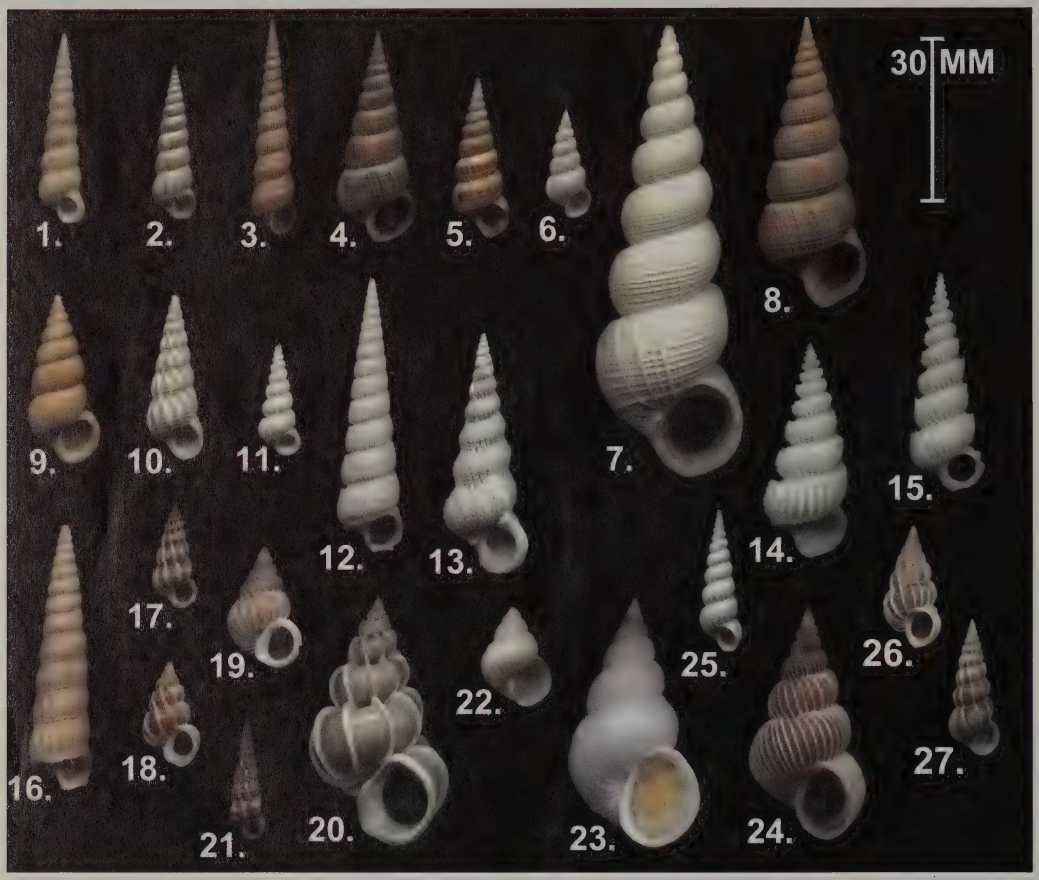
The Wentletraps (Epitoniidae): A Study in White and White

by Bruce Neville
photos by Tom Eichhorst

Most collectors are familiar with wentletraps as a family to be tackled after one has thoroughly grasped the turrids—both are large families, frequently with tiny shells, often difficult to obtain, and then even more difficult to identify. Most collectors have the few "standard" species, available relatively inexpensively from dealers, but they seldom venture beyond that limited number. Frequently, upon receiving a "new" species from a dealer, the collector may find it doesn't quite match the description in the book (assuming he can ***find*** a description), and he is left with another puzzle.

So why bother?! Because "eps" are undeniably beautiful. The precious wentletrap, *Epitonium scalare* (Linnaeus, 1758), is a paragon of simple elegance that has been highly sought since the days of cabinets of curiosities. The precious wentletrap is a legendary rarity, and huge sums were paid for the few specimens known in the 18th and early 19th centuries. The story of rice-paste counterfeits made by the Chinese is probably apocryphal. Now, specimens of *E. scalare* sell for only a few dollars, and most collectors have one or a few.

The name "wentletrap" is said to come from the Dutch "wendel



1. *Acrilla (Fragilopalia) garciai* (Kilburn, 1994), Philippines.
2. *Acrilla (Fragilopalia) nebulodermata* (Azuma, 1972), Taiwan.
3. *Acrilla (Acrilla) acuminata* (Sowerby ii, 1844), Taiwan.
4. *Amaea (Amaea) mitchelli* (Dall, 1896), Colombian variant.
5. *Amaea (Amaea) mitchelli* (Dall, 1896), Texas.
6. *Amaea (Filiscala) martinii* (Wood, 1828), Queensland.
7. *Amaea (Amaea) magnifica* (Sowerby ii, 1844), South China Sea.
8. *Amaea (Scalina) ferminiana* (Dall, 1908), Panama (Pacific).
9. *Amaea (Scalina) tehuanarum* DuShane & McLean, 1968, west Mexico.
10. *Boreoscala greenlandica* (Perry, 1811), Arctic Ocean.
11. *Boreoscala zelebori* (Dunker, 1866), New Zealand.
12. *Cirsotrema (Cirsotrema) kieneri* Tapparone-Canefri, 1876, Western Australia
13. *Cirsotrema (Cirsotrema) varicosum* (Lamarck, 1822), Philippines.
14. *Cirsotrema (Discoscala) edgari* (de Boury, 1912), Philippines.
15. *Cirsotrema (Elegantiscala) rugosum* Kuroda & Ito, 1961, Philippines.
16. *Claviscala terebralioides* (Kilburn, 1975), South Africa.
17. *Epitonium (Clathrus) clathrum* (Linnaeus, 1758), Spain.
18. *Epitonium (Epitonium) pallasi* forma *pallasi* (Kiener, 1838), Philippines.
19. *Epitonium (Epitonium) pallasi* forma *neglectum* (Adams, 1850), Philippines.
20. *Epitonium (Epitonium) scalare* (Linnaeus, 1758), Philippines.
21. *Epitonium (Fuscoscala) turtonis* (Turton, 1819), Spain.
22. *Epitonium (Globiscala) bullatum* (Sowerby ii, 1844), South Africa.
23. *Epitonium (Limiscala) irregulare* (Sowerby ii, 1844), Philippines.
24. *Epitonium (Papyriscala) imperiale* (Sowerby ii, 1844), Western Australia.
25. *Epitonium (Sodaliscala) gradatum* (Sowerby ii, 1844), Panama (Pacific).
26. *Gyroscala lamellosa* (Lamarck, 1822), Florida.
27. *Gyroscala lamellosa* (Lamarck, 1822), Italy.

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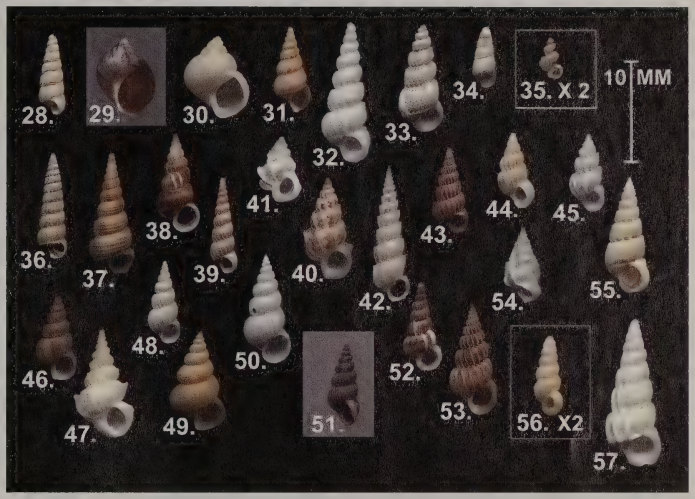
treppe," or "spiral staircase," after the evenly spaced axial ribs, or costae, ascending the spire. The same metaphor is exploited in the obsolete names *Scalaria* and *Scala* for the genus (and *scalare* for the type species). *Epitonium* appears to mean a tuning peg, as on a violin.

The name *Epitonium* is now almost universally accepted for the primary genus, but it was not always so. Linnaeus placed the three species known to him (*scalare, clathrus,* and *crenata*) in his broad genus *Turbo*. The name *Scala* is pre-Linnaean, and there are debates about when it was first properly used, but its first valid use is pre-dated by both *Epitonium* and *Scalaria*. The name *Epitonium* was erected by Röding, based on Bolten's classification, in 1798. In addition to what we now know as wentletraps, he also included all of the Turritellas and Terebras in the genus. Röding's publication, however, and the names in it, were treated as unavailable for 108 years. Meanwhile, Lamarck erected the genus *Scalaria* in 1822 for the same group of shells. Because the rules at that time prohibited "tautonymy," or the duplication of names, *Turbo scalare* Linnaeus, 1758 had to become *Scalaria pretiosa* Lamarck, 1822, a name that still is occasionally seen today. William Healey Dall (1906) argued successfully that the names in Röding's catalog were accompanied by suitable references for their day and were acceptable for use, thereby relegating many widely used generic names to synonymy. European authors were slower to pick up on the change, and de Boury, in France, continued to use *Scalaria*, while Thiele, in Germany, continued to use *Scala* well into the Twentieth century. For some reason, some paleontologists are still using *Scala*!

E. de Boury is an interesting character. He was working at the Museum National d'Histoire Naturelle in Paris at the turn of the century, at the same time Dall was working at the Smithsonian. De Boury always referred to the "monograph" on which he was working, but only a few pieces ever saw print. He created literally scores of subgenera, usually only by designating a type species. Many are obviously synonyms; a few are still in use. In writing, he always referred to himself as "nous" ("we"). He referred to Dall as "our learnéd colleague," but lamented (de Boury, 1919; my translation) that, "if only he'd look more closely, he'd realize that our many subgenera are genuine"!

Now that you're thoroughly confused (and amused) by the nomenclature, let's get back to the shells and the animals in them. Members of the family can be found in nearly all seas at nearly all depths. *Boreoscala greenlandica* (Perry, 1911) is found in the Arctic Ocean at Point Barrow, Alaska, while *Opalia antarctica* (E. A. Smith, 1907) is found at the very edges of the Antarctic ice. A few species, such as *Gyroscala lamellosa* (Lamarck, 1822) and *Cirsotrema pumiceum* (Brocchi, 1814) are found nearly worldwide. Some, such as *E. tollini* (Bartsch, 1938) are limited to a very small range. Actually, as we look harder, we find that many of the "restricted" species also have a wider distribution. For instance, *E. novangli* (Couthouy, 1838) was so named because the type specimen was taken from the stomach of a cod fished off Martha's Vineyard—the species has never been collected farther north than Virginia since! Most species are found from the intertidal to moderate depths; a few species can be classified as abyssal. The family goes back in the fossil record at least to the Jurassic and flourished in the Miocene and Eocene. There are approximately 600 Recent species in the family.

When confronted with a mystery wentletrap, resist the temptation to look at the costae for a moment. Look first at the locality data (if you can trust it). Sometimes you can geographically narrow the choices to a few—and sometimes you can't. Members of the family truly can be said to have explored completely the spectrum of "white": nearly all of the species are white, whitish, off-white, cream, ivory, alabaster, snowy, milky, or chalky. Color then, when it occurs, can be a very useful identification tool. Next, look for a basal cord. Many of the smaller genera have a basal cord, while true *Epitonium* does not. When identifying a true *Epitonium*, check next for spiral sculpture (which is most easily seen on the early whorls) and the broadness of the umbilicus. These characters will divide the species into four groups—with and without spiral sculpture, with and without an open umbilicus—and will greatly narrow down the possibilities. *Now* you may look at those costae—how many on the body whorl? Are they rounded or sharp? reflected or erect? roughly vertical or strongly oblique? hooked at the shoulder or not? connected with those of the previous whorl or not? All of these are important in the final identification. The number of



28. *Acirsa eschrichtii* ('Hölböll' in Müller, 1842), Newfoundland.
29. *Alexania inazawai* (Kuroda, 1943), Japan.
30. *Alora annulata* (Kuroda & Ito, 1961), Mozambique.
31. *Amaea* (*Acrilloscala*) *turnerae* (Altena, 1971), Florida.
32. *Boreoscala blainei* (Clench & Turner, 1953), Florida.
33. *Cirsotrema* (*Cirsotrema*) *cochlea* (Sowerby ii, 1844), Spain.
34. *Couthouyella striatula* (Couthouy, 1839), Nova Scotia.
35. *Cycloscala hyalina* (Sowerby ii, 1844), South Africa.
36. *Cylindriscala nitida* (Kuroda & Ito, 1961), Japan.
37. *Eglisia spirata* (Sowerby i, 1825), Senegal.
38. *Epitonium* (*Depressiscala*) *aurita* (Sowerby ii, 1844), Japan.
39. *Epitonium* (*Depressiscala*) *nautlae* (Mörch, 1874), Florida.
40. *Epitonium* (*Epitonium*) *marmoratum* (Sowerby ii, 1844), Queensland.
41. *Epitonium* (*Hirtoscala*) *replicatum* (Sowerby ii, 1844), Australia.
42. *Epitonium* (*Hirtoscala*) *shyorum* DuShane & McLean, 1968, west Mexico.
43. *Epitonium* (*Hirtoscala*) *tenebrosum* (Sowerby ii, 1844), South Africa.
44. *Epitonium* (*Hyaloscala*) *fabrizioi* Pastorino & Penchaszadeh, 1998, Argentina.
45. *Epitonium* (*Lamelliscala*) *angulatum* (Say, 1830), Florida.
46. *Epitonium* (*Papyriscala*) *tenellum* (Hutton, 1885), Australia.
47. *Cirsotrema* (*Cirsotrema*) *bennottorum* Garcia, 2000, New Caledonia.
48. *Epitonium* (*Sodaliscala*) *multistriatum multistriatum* (Say, 1826), South Carolina.
49. *Alora billeeana* (DuShane & Bratcher, 1965), Okinawa.
50. *Amaea* (*Filiscala*) *martinii* (Wood, 1828), Australia.
51. *Gyroscala purpurata* (Dall, 1917), Panama (Pacific).
52. *Gyroscala rupicola* (Kurtz, 1860), Florida.
53. *Gyroscala rupicola* (Kurtz, 1860), Florida (variation).
54. *Gyroscala statuminata* (Sowerby ii, 1844), Panama (Pacific).
55. *Opalia* (*Dentiscala*) *crenata* (Linnaeus, 1758), Spain.
56. *Opalia* (*Nodiscala*) *bicarinata* (Sowerby ii, 1844), Tahiti.
57. *Opalia* (*Opalia*) *australis* (Lamarck, 1822), South Australia.

costae per whorl may vary with age (Robertson, 1983); a sudden decrease in the number of costae per whorl is an important clue to the identification of *Epitonium (Sodaliscala) apiculatum* (Dall, 1889). Another important clue toward the end of the process is the depth of the sutures.

The shell is composed almost entirely of calcite, one of two crystalline forms of calcium carbonate, the other being aragonite, which forms the largest part of the shells of most mollusks. While aragonite is not stable in geologic time and is replaced in fossils, calcite is stable and preserved, so fossil eps are the actual shell laid down by the animal. Wentletraps generally are not found without a costa at the aperture. This is because the costa and the intercostal space behind it are laid down at the same time, sometimes in as little as a day. Thus, if the costa is broken before it hardens, the space behind goes with it, leaving the aperture at the previous costa. A thin periostracum is present in a few species. The operculum is corneus and varies in color from amber to black. It may be paucispiral (as in *Opalia*) or multispiral (as in *Sthenorytis*).

Little is known about the animal inside the shell. The foot is truncated anteriorly, and there is an extensible proboscis, which lacks a true mouth. Strangely, Saunders (1995) noted that *E. clathrus* (Linnaeus, 1758) at Portland, England, had two distinctly different patterns of pigmentation to the animal and that these correlated with habitat, suggesting that there may be sibling species involved.

So far as is known, all members of the family but one feed on coelenterates. Some remain closely associated with their prey and could be classed as parasites, while others roam around, sampling from several plates, and would properly be called predators. Some eps appear to be specialists on one species of host, while others may feed on several species. Most prefer sea anemones, but a few species prey on corals. Members of the genus *Iphitus* apparently live in galls developed around them by their coral hosts. In some cases, wentletraps suck the body fluids directly through a straw-like proboscis; in others, they bite off pieces directly from the tips of the arms. The golden wentletrap, *Alora billeeana* (DuShane and Bratcher, 1965), with both a yellow animal and a yellow shell, is perfectly camouflaged on its yellow coral hosts of the genera *Tubastraea* and *Dendrophyllia*. The sole exception to the coelenterate rule appears to be *E. ishimotoi* (Masahito and Habe, 1972), which lives on sponges that in turn live commensally on the turbinid *Guildfordia*—now *that's* a specialist! Eps have a distinctive radula, called ptenoglossate ("comb-tongued"), consisting of a rows of many narrow, sharp teeth and lacking a central tooth. In at least one species, the radular teeth have been observed to change during development, possibly in connection with the sex change (Page and Willan, 1988). Eps also exude a purple fluid, similar to that of muricids. The function of the fluid is not known, but it is thought to anesthetize the prey/host so that the snail can feed at leisure.

The wentletraps are protandric hermaphrodites, that is, they begin life as males and later in life become females. The male stage has no penis. Two types of spermatozoa are produced. The normal, fertilizing sperm are attached to large paraspermatic cells to form spermatozeugmata, the "packets" of sperm that are transferred to the female. In the species where egg laying has been observed, the egg capsules are small, spherical, composed of sand and mucus, and laid on a long proteinaceous strand, like widely separated beads on a string. The eggs generally hatch as veligers, which may stay for over a month suspended among the plankton before settling, which can explain the wide distribution of some species. A few species, such as *B. greenlandica*, are believed to have direct development, i.e., the eggs hatch directly into crawling larvae. Maturation is rapid in many species that have been studied. *E. ulu* Pilsbry, 1921, has been observed (Guinter, 1970) to reach sexual maturity in under three weeks from the time the larvae settles near its host! *E. ulu*, by the way, is one of the coral-associating species, and it lays its eggs on the underside of its solitary coral "host."

So far, I have spoken only of the "typical" wentletraps. There is a second subfamily, the Nystiellinae, all of which are deep-water, and most of which are quite rare, found virtually only in museum collections. The nystiellines differ from typical epitoniines in having a ribbed protoconch (that of the typical epitoniines is smooth) and having a different radula, so some authors would raise them to the level of family.

The closest relatives of the Epitoniidae are the purple sea-snails of the family Janthinidae, with which they share the ptenoglossate radula, the calcitic shell, protandry, spermatozeugmata, and the habit of feeding on coelenterates. At first glance, the pelagic janthinids would seem unlikely cousins of the wentletraps, but take a look at *Alexania* among the wentletraps and *Recluzia* in the Janthinidae. Members of the little-known family Aclididae also have a ptenoglossate radula and are placed in the same superfamily.

The accompanying plates show examples of many of the genera and a number of species that are not often seen. My thanks to Tom Eichhorst for his photography and preparation of these plates.

The main genera available to collectors are:

Acirsa. Relatively elongate; sculpture very weak, but may be spiral or axial or both; axial sculpture, when present, generally low undulations, rather than ribs; outer lip thin; mostly polar; type *eschrichtii* (Höllböll, in Müller, 1842)

Acrilla. Generally very long and slender; spiral sculpture lacking; axial riblets very fine, from few to many; type *acuminata* (Sowerby, 1844).

Alora. Usually globose; with equal, cancellate sculpture; umbilicus open or closed; type *gouldi* (A. Adams, 1857).

Amaea. Approximately equal, cancellate sculpture, sometimes with an occasional thickened varix; sculpture may differ markedly above and below a spiral cord (subgenus *Scalina*) or not (subgenus *Amaea, s.s.*); type *magnifica* (Sowerby, 1844).

Boreoscala. Similar to "typical" *Epitonium*, but with strong, often crenulate, costae and noticeable spiral sculpture; a basal cord is present; type *greenlandica* (Perry, 1811).

Cirsotrema. With costae often formed of fine lamellae, highly elaborated, often nearly forming a secondary shell outside the primary; a basal cord is present; type *varicosa* (Lamarck, 1822).

Cycloscala. Like "typical" *Epitonium*, but the later whorls are completely separate; costae often crenulate; protoconch multispiral; type *dunkeriana* Dall, 1889.

Eglisia. Shell long and slender; spiral sculpture of strong cords dominating; axial sculpture only of fine growth lines; type *spirata* (Sowerby, 1825).

(Continued on page 31)

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(Eichhorst article continued from page 25)

(E.A. Smith, 1906), from India, is light colored with dark brown spiral ridges, small, closely set axial ribs, the tallest spire of any of the figs, and an outer lip that meets the last whorl well down from the spire. Both *Ficus filosa* (G. B. Sowerby III, 1892) and *Ficus ventricosa* (G.B. Sowerby I, 1825) have extremely prominent spiral ridges. *Ficus filosa* is from Indo-Pacific waters and has one smaller ridge in between the large ridges with very prominent axial ribs. It is a much thicker shell than any other fig. *Ficus ventricosa* is a Pacific shell from Mexico to Peru and has three or four smaller ridges in between the large ridges and small axial ribs.

The remaining fig from this area is extremely rare in collections and does not look like it belongs in the Ficidae family. This is *Thalassocyon bonus* Barnard, 1960 from New Zealand and South Africa (*Thalassocyon tui*, Dell, 1967 is a synonym). This is a deepwater species trawled from 1,000 meters. They are from 35 to 50 mm in length and have an operculum, unlike any other Ficidae. In looks they are much more like a *Busycon*, but animal anatomy, radula characteristics, and feeding biology all place this seldom seen species in the Ficidae.

Atlantic Ocean and Caribbean Sea Ficidae

In the Atlantic and Caribbean the situation is equally difficult for identification. There is the deep-water *F. pellucida* (form *howelli*) from the waters around Cuba and Trinidad and (form *atlantica*) from further south off of Colombia and Brazil. Both forms are small, dark-cream colored shells with dark brown spots, but in the north, *F. pellucida* (form *howelli*) has a more slender shape, fewer spots and a finer surface sculpture. *F. p. howelli* typically have six spiral rows of spots in a fairly neat pattern, while to the south, form *atlantica* has 12 or more spiral rows of spots and the pattern is anything but neat. Abbott and Dance are among the authors who speculate these differences might in fact be male and female forms. To date, hard evidence for this theory is lacking, leaving geographical separation as the simplest explanation for the differences between these two forms. In recent years there have been a number of shells offered as *Ficus howelli* from off of Columbia that seem to be intermediate in features between the two forms—adding to the single species theory. The other ficids in this area are the *Ficus papyratia* complex. This group of look alike shells includes: *Ficus papyratia papyratia* (Say, 1822) (syn. *F. communis*, of authors, not of Röding) *Ficus papyratia carolae* Clench, 1945 (listed as a form by Verhaeghe and Poppe), *Ficus papyratia lindae* Petuch, 1988, and *Ficus papyratia villai* Petuch, 1989. All of these are quite similar in appearance. *Ficus papyratia papyratia* is found in shallow waters off the East Coast of the U.S. throughout the Gulf of Mexico to the Yucatan Peninsula. *Ficus papyratia carolae* is a deep-water form found off the Florida Keys to Honduras. *Ficus papyratia lindae* is found in shallow water off northern Colombia and Venezuela. Last, *Ficus papyratia villai* seems restricted to the shallow waters of the coasts of Nicaragua and Honduras.

Chris Vos of Belgium has studied Ficidae for years and provides the following guidelines to help differentiate the species in the *Ficus papyratia* complex. *Ficus papyratia papyratia* has a flat top and is rather broad shouldered. The axial ribs are hardly visible, but the spiral ribs are prominent and run in a specific pattern (AcbcAcbcA—where A is the largest rib, b the second largest, and c a very small rib). *Ficus papyratia carolae* is slender, with a rather elevated top, and the spiral ribs have an AbAb pattern with an occasional smaller rib in between. Like *Ficus papyratia papyratia*, the axial ribs are hardly visible. *Ficus papyratia lindae* is easy to recognize by the regularly appearing, thicker rib with white blotches and by the overall slender shape of the shell. *Ficus papyratia villae* has an elevated spire, a purple or pink aperture, the most slender overall build of the four, and a pattern similar to *Ficus papyratia carolae*, but with distinct axials, giving it a netted pattern rather than the ribbed pattern of the other two. Actual identification is almost a Gestalt process. The overall appearance of the shell as well as surface sculpture details are both necessary inputs to identification. Of course, decent locality data makes the identification process much surer.

For the collector wanting more information on Ficidae there are general shell books with limited information and most recently the Ficidae edition of *A Conchological Iconography*, Marcel Verhaeghe and Guido T. Poppe, 2000. This source contains a wealth of excellent images of the different species and subspecies of Ficidae. As a collectible family, Ficidae are almost perfect. There are only a few species, and all but two are available at a reasonable price. The two expensive figs are *Ficus pellucida* and *Thalassocyon bonus*; the latter would cost in the neighborhood of $2,000, if it was ever offered.

Images are computer scans by the author except the *Ficus pellucida* form *howelli* which was courtesy of Dr. Harry G. Lee and the *Thalassocyon bonus* which is an artist's conception by Donnie Eichhorst.

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(Neville article continued from page 30)

Epitonium. A large genus with many subgenera, nearly always with costae; spiral sculpture may or may not be present; the umbilicus may or may not be open; a basal cord is never present; type *scalare* (Linnaeus, 1758).

Gyroscala. Similar to "typical" *Epitonium*, with costae fine to quite strong, often with varices; similar to *Boreoscala*, but lacking the spiral sculpture; always with a basal cord; type *lamellosa* (Lamarck, 1822).

Opalia. A strange genus of several subgenera united by possession of an intritacalx, or pitted chalky layer external to the primary shell, which is often eroded in dead-collected specimens; a basal cord is present. In the typical subgenus, axial ribs are rounded and well-defined along the entire height of the whorl; type *australis* (Lamarck, 1822). In the subgenus *Dentiscala*, the axial ribs are reduced to coronations near the suture, or at least fade out well before the middle of the whorl; type *crenata* (Linnaeus, 1758). In the subgenus *Nodiscala*, the shell is narrow; the ribs are low, but well-defined, and end in small crenulations at the suture; type *bicarinata* (Sowerby, 1844).

Sthenorytis. Shell very heavy, with flaring costae; the aperture is set at an angle to the columella; only three living species; type *expansa* (Conrad, 1842), a fossil.

Other genera (* = nystiellines): *Alexania*, *Berthais*, *Chuniscala*, *Claviscala*, *Couthouyella*, *Cylindriscala*, *Ecclieseogyra**, *Funiscala*, *Gregorioscala*, *Iphitus**, *Kurodacirsa*, *Murdochella**, *Narrimannia**, *Narvaliscala*, *Opaliopsis**, *Papuliscala**, *Periapta*, *Plastiscala*, *Problitora*, *Punctiscala*, *Rutelliscala*, *Sagamiscala*, *Variscala*.

EUVOLA ZICZAC
(Linnaeus, 1758)

A, C and E: Trawled by shrimpers in 200 ft. off Key West, Florida.
D: Lower valve of C.
B: Trawled by shrimper, 30 fathoms off Cabo La Viela, Columbia South America.
F: Trawled on sand bottom, offshore, 32-38 meters, Boca de Aroa, Venezuela.

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Living Jewels from Mexico's Mysterious Sea of Cortez

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VOL. 29 No. 2 JUNE 2001

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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President's Message

As we look forward to the 2001 Space Odyssey in Melbourne, the Board of Directors and I wish to say thanks to the membership for all of your support and input in the past year. It has been a busy one for the Board. We have worked with the 2001 Convention Committee to see that this convention will be memorable in more ways than one. I am sure that many of you who are subscribers to Conch-L have read the wonderful things that Bobbi Cordy and the committee have planned for the convention.

The Board has also been busy working on the 2002 and 2003 Conventions. Be sure to come to 2001 Shell Odyssey in Melbourne and hear about all the great things planned for the next two years.

I would like to take this opportunity to welcome Jim Miller to the staff of *American Conchologist*. Jim has agreed to do all the graphics, design work and photo editing along with Lynn. Many of the recent pictures and articles (as well as the front and back covers of this issue) are products of Jim's talent. Welcome Jim. This magazine has had such high quality that we want to make sure we maintain this standard well into the future.

Don't forget to send in your news and articles to Lynn so that she has material to work with. The *American Conchologist* belongs to every member of COA. Without your input Lynn, Jim, Char Lloyd and the rest of the staff would not have a magazine to produce for you. Keep those articles and pictures coming.

I am truly looking forward to the 2001 Shell Odyssey, which is coming up fast. If you haven't registered yet, please do so NOW.

Betty Lipe

ABOUT THE COVERS

We let our new designer and photo editor, Jim Miller, "slip his leash" a bit this issue and he's come up with two fabulous covers, each illustrating one of our feature stories. On the front cover is a gorgeous specimen of *Hexaplex princeps* which Jim superimposed over a slightly out-of-focus shot of the Sea of Cortez using Adobe Photoshop. Both images were made using an Epson 850Z digital camera at maximum resolution and processed using Altamira Group's Genuine Fractals software, which allows digital photos to be enlarged beyond their original size without losing details. The *H. princeps* here is a nice representative of the darker form of this species. For more photos and Jim's article about shelling in Baja, see Page 4.

For our stunning back cover, Jim chose one of the most colorful specimens of *Euvola diegensis* he had received in trade from Paul Kanner. The shell was collected on December 12th of 1999 inside the hull of the wreck of *The Olympic*, which sits in 95 feet of water about three miles outside of Los Angeles Harbor.

Pecten fans in particular will love Paul's exclusive account of his discovery of many new locations for this beautiful (and quite variable) species which begins on Page 6. Jim has also put together a photo montage of a number of absolutely stunning *E. diegensis* specimens on Page 7. Paul has promised to do a followup article in an upcoming issue of *American Conchologist* on his many other spectacular — and surprising — finds in the Los Angeles-Long Beach Harbor area.

Advertising in **AMERICAN CONCHOLOGIST** is presented as a service to our membership, but does not automatically imply endorsement of the advertisers by **AMERICAN CONCHOLOGIST** staff or the Conchologists of America, Inc. Advertising space is avaliable at the following rates: 1/2 page: $600 per year or $165 per issue. 1/4 page: $300 per year or $83 per issue. 1/8 page: $150 per year or $50 per issue. Color prices available on request. Deadlines are as follows: #1 Jan 15. #2 Apr. 1. #3 July 11. #4 Oct. 1. Copy may be changed for any issue. Send advertising copy to the editor, Lynn Scheu, 1222 Holsworth Lane, Louisville, KY 40222. Send as payments and space reservations to Advertising Manager Lori Schroeder, 211 E. Stephen Foster Ave., Bardstown, KY 40004-1513, Phone, 502-349-2001, E-mail: *conchhorn@bardstown.com*. Make checks payable to Conchologists of America. Also note that American Conchologist accepts single sheets (8 1/2" X 11") or 11" folio advertising inserts. Inquire for price and requirements by contacting that advertising manager.

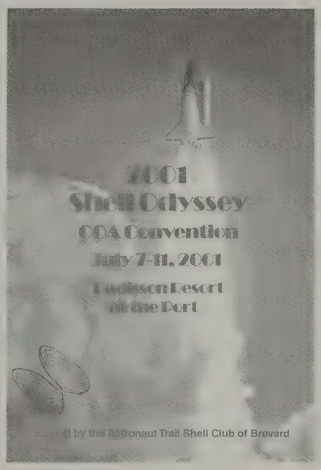
The Launching of 2001: A Shell Odyssey

by Bobbi Cordy

We are about ready to go into orbit . . . literally! Especially with all the last minute details for the 2001 convention.

EARLY-EARLY registration will be from 7 to 9 p.m. on July 5th, especially for those who are going on the Harbor Branch field trip on the morning of July 6th. Registration will also be open on July 6th from 1 to 4 p.m. and from 7 to 9 p.m. In addition, there will be a turtle watch that evening.

The **International Bourse** is packed out! Over 31 dealers! You won't want to miss it. You will think you've gone right to Shellers' Heaven.



Signing up for the **Workshops** will be done as you register and pick up your convention packet. There are workshops that will interest every collector. Bring your questions and ideas to share. The workshops will be a great time to get into small interest groups to meet shellers who are interested in and learning about the same things you are interested in. We have some great experts to lead these small groups. You will have an opportunity to attend two workshops during the evening of Sunday, July 8th. They include the following:

Tips for Shell Photography: A Traditional Approach using 35 mm Film and Camera by Alice Monroe
Shell Show Exhibiting: Philosophy and Hands-on Solutions by Gene "Supersheller" Everson
Cleaning Shells with Admirable Results by Jim Cordy
How to Collect, Curate and Store Shell-related Items by Ruth Abramson
Outfitting for Shell Collecting Trips: Gadgets, Gizmos, and Techniques by Peggy Williams
Identification Workshop for Land Shells by Richard Goldberg
Identification Workshop for Marine Shells by Gary Rosenberg and Kevan Sunderland
How to Curate and Store Your Shell Collection by Homer Rhode
Macrophotography of Live Mollusks by Charlotte Lloyd
Digital Photography

SCHEDULE OF EVENTS for the Convention is as follows:

Saturday, July 7: Registration; Information Table; Club Sales Tables; COA sales table; 50 cent Bargain table; interesting shell-related exhibits; the opening ceremony which will be very special; a Caribbean Style Welcome Party which will hold lots of surprises.

Sunday, July 8: Programs all morning and afternoon, then workshops in the evening.

Monday, July 9: COA Reps Continental Breakfast, Silent Auction and single specimen mini shell show; preview of Auction from 1-2 p.m. and auction from 2-6 p.m.; Conch-L gathering in the evening.

Tuesday, July 10: Preview of 2002 Convention and Business Meeting; Bourse Set Up from 12:30 – 4 p.m.; Bourse, with adjoining snack bar and cash bar 4 to 11 p.m.

Wednesday, July 11: Bourse open all morning from 9 a.m; field trip to Spaceport USA – Kennedy Space Center at 11 a.m; Riverboat Luncheon Cruise; Banquet with Speaker: S. Peter Dance

RAFFLE ITEMS will include the following:

- *Perotrochus vicdani*, Kosuge, 1980 donated by Donald Dan
- *Conus milneedwardsi*, Jousseaume, 1894 donated by Larry Strange
- "She'll Love It!" A huge white shell chock full of things to pamper *her!* Donated and created by Carol and Art Haugh
- Shell Afghan – handmade in mauve and cream, donated and created by Bobbi Cordy
- Sailor's Valentine – handcrafted, donated and created by Jane Santini
- Carved Wooden Shells (*Lambis crocata, Lambis digitata, and Lambis chiragra*) donated and created by Tropical Art Designs

RAFFLE TICKETS will be $2 each or three for $5! You can put your tickets in the box for the Raffle items you REALLY want!

TRANSPORTATION: Cocoa Beach Shuttle to and from the Orlando International Airport 1-800-633-0427 or (321) 784-3831. Cost is $22 for one way. They will drop you off at your airlines. Pickup is at the ground level at Space #18. A Local Van is available to the beach area every 20 minutes from the hotel (free).Transportation will be provided for all field trips and are included in the price.

The Astronaut Trail Shell Club of Brevard, Inc. is really looking forward to hosting you for a great fun week in Cape Canaveral, Florida. If you have any last minute questions about the convention, do not hesitate to call or contact: **Bobbi Cordy** at (321) 452-5736 *cordy@yourlink.net* or **Doris Underwood** at (321) 724-2449 *dunderwood@cfl.rr.com*

We Remember . . .

Gugliemo Biraghi
Alex Kerstitch
Eleanor Rothoff, COA member

Thanks!

Our COA Membership Director, **Doris Underwood** wishes to thank all those who sent cards, e-mails, calls and good wishes while she was recuperating from surgery. She says they were very warming and encouraging to her.

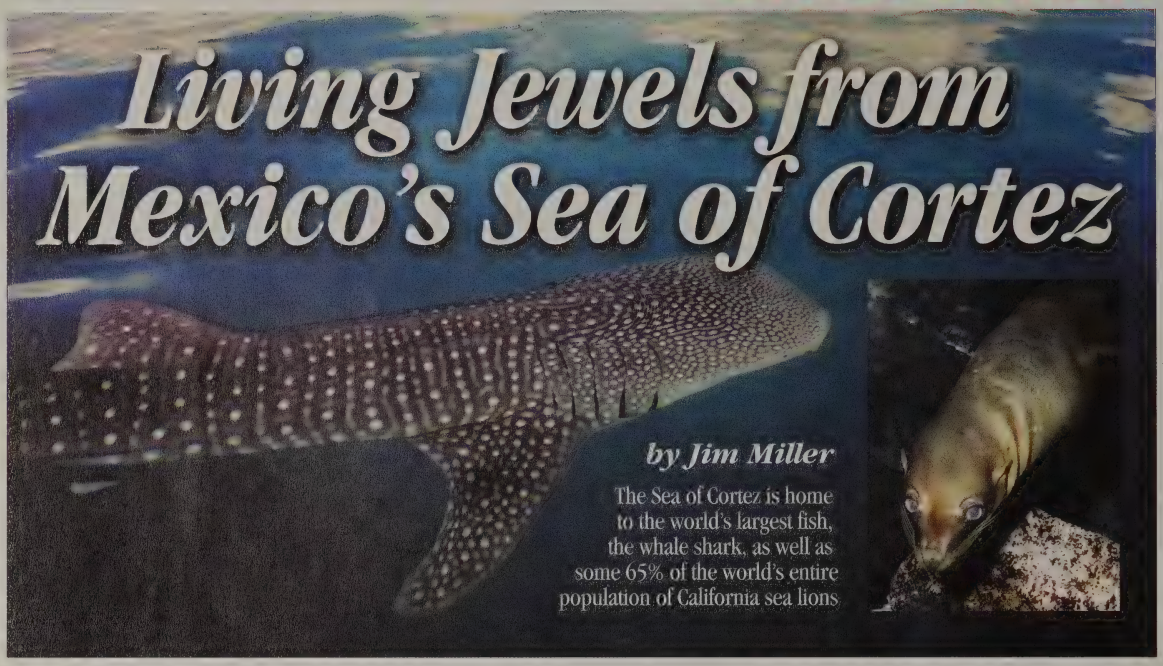
Cecilia Abbott has had shoulder surgery. We all want to wish her the very best for a rapid recovery.

Looking for speakers!!!

COA 2002 Convention
"Circus of Shells"
Sarasota, Florida
July 13 (preregistration - July 12th) to July 17
(possible field trip July 18th)
If you would like to be a speaker, please contact
Debi Ingrao at Mote Marine Laboratory,
1600 Ken Thompson Parkway, Sarasota, Florida 34236;
Phone: (941) 388-4441 ext. 295; E-mail: *debi@mote.org*

AMERICAN CONCHOLOGIST **ON LOCATION**

Living Jewels from Mexico's Sea of Cortez



by Jim Miller

The Sea of Cortez is home to the world's largest fish, the whale shark, as well as some 65% of the world's entire population of California sea lions

Baja. The Sea of Cortez. Just the words alone conjure up images of desolate, rocky cliffs overlooking the clear deep blue waters where chance encounters with some of nature's most awesome creatures are possible: from 50-foot whale sharks and giant Pacific Mantas to vast schools of hammerhead sharks. Here the sun sets, lighting up the sky with a thousand breathtaking colors, until finally the stars come out, floating jewel-like on a warm breeze that caresses the shore. It's soft moonlight, great food, music with a hot Latin beat and . . . brightly colored *Spondylus*.

Okay, it's no secret that I love diving Baja. It's the only place I've ever interacted with a colony of playful sea lions and swam with a huge whale shark, all in the same day. Every dive here is an adventure, because you truly can never guess what you might see. On the way out to a dive site, we've been passed by pods of pilot whales, a pair of gray whales and once, the largest whale of them all, the gigantic Blue Whale that comes here to dine on the rich harvest of plankton. In fact, almost all the impressive sea life is here because of these tiny organisms that exist at the bottom of the food chain.

Hexaplex princeps

My first trip to Baja was almost a decade ago, my latest in September of 2000. In truth, when I arrived in Baja the very first time, it was with some degree of trepidation. It was my first time out of the United States. I didn't speak the language. I just plain didn't know what to expect. As it turned out, all my fears were for nothing, as I have had nothing but wonderful times there. And though I know only a few words of Spanish, most everyone speaks at least some English. What's more, I doubt that I have ever been treated as warmly or felt more welcome than in Baja. If I could afford the airfare, I'd return every year, even though the trip is mind-numbingly long from Tallahassee, Florida—with good connections, you still spend almost nine hours in the cramped confines of a commercial airliner.

Arriving at La Paz (the capital city of Baja Sur) is always an adventure in itself. If you get there during the day, it can be brutally hot—easily over a hundred degrees in the shade—and then comes the mad scramble as the luggage is unloaded and you pray that your dive gear made it safely all the way across the continent with you. Next, bags in tow, you have to line up and pass through customs where random checks are done on luggage (though I've never had that misfortune). Naturally, you wonder if the taxi that is supposed to be there to pick you up will actually be waiting (it almost always is). At last, after a hot drive through the heart of La Paz (most taxis are not air conditioned), you wind up at your hotel (which, fortunately, is air conditioned). Our favorite, La Concha, right on the sparkling waters of La Paz Bay, is home to the Cortez Club, on whom we always count to take us diving in the best spots.

One thing to keep in mind: once you are actually in Baja, pack away your wristwatch. This is not a place where anyone is in a hurry. As long as you make it to the dive boat by around nine, you can just forget about time the rest of the day. Since the dive sites are anywhere from 45 minutes to an hour and a half away, the Cortez Club (and other dive operations, I'm sure) only plans on going out once a day, so there's never a big rush to get back and pick up the next batch of divers. If you arrive back at the dock at two o'clock or four, it's all the same to them.

But you aren't interested in a travelogue. You want to read about shells. Well, the truth is, the first two or three times we dove out of La Paz, I wasn't even looking for shells. It had been many years since circumstances had forced me to set aside my interest in molluscs and part with my original collection, most of which was made during the late 1960s and early 70s. But

— Continued on Page 8

BAJA
SPONDYLUS
PRINCEPS
Photo montage by
Jim Miller

Locating a Habitat of *Euvola diegensis* (Dall,1898)

by Paul Kanner

At the beginning of March of this year, while attending a fishing and boat show here in southern California, I chanced upon a chart showing many of the hot fishing spots from Point Fermin to Newport Beach. The main area illustrated on the chart encompasses rock piles, wrecks and reefs that are from three to five miles outside the Los Angeles, Long Beach Harbors.

This particular area has the local name of Horseshoe Kelp, and the depths here range from 60 feet at the shallowest spots down to around 150 feet. Many of these locations have been closely guarded secrets of the local charter fishing fleet for many years and their disclosure has understandably angered many of the skippers. Except for some of the wrecks, divers do not often explore the reefs and rock piles. The publication of this chart seemed like an excellent opportunity to check out some of these areas for our native mollusks. I have always preferred locations along the coast for shelling and I had high hopes that these unexplored areas would yield some interesting finds. I was not disappointed.

My good friend and diving buddy, Dr. Andy Saxon, owns a 25-foot boat set up strictly for diving. The boat has a very good GPS and fathometer, making it possible to locate very small structures on the bottom. When I am not working as second skipper on the charter dive boat "Westerly," I enjoy diving with Andy on his boat. He is not a shell collector, but he is always game to try something new. I showed him the newly published chart and he was as excited as I was to explore these spots. We determined to start our exploration as soon as our schedules and the weather cooperated. That finally happened on April 1, 2001.

We launched Andy's boat at the Cabrillo Beach launch ramp inside the west edge of the Los Angeles Harbor. It was a short run to our first destination, about three miles south-southeast of the harbor entrance. The chart indicated a small rock reef in about 95 feet of water. We motored around until we got a good fix on the spot and dropped a marker buoy on top of it.

Andy made the first dive while I followed his bubbles with the boat. He surfaced about twenty minutes later and reported the conditions below to be cold and dark with only a few feet of visibility. Then he took two nice *Euvola diegensis* from his game bag. "Are these any good?" he asked. After seeing those scallops, I decided to make the dive regardless of conditions. I hoped to find some for myself.

By the time I hit the bottom, it was indeed very dark and cold, making it difficult to see the habitat clearly. However, I still managed to find six nice specimens of *E. diegensis*. I was very excited because the most I had ever collected on any dive was three.

While off gassing from our first dive, we moved the boat to a new area about a mile from the first spot. We got a very solid meter reading indicating a nice reef in 80 feet of water. This dive proved to have much better visibility. As I descended to the bottom, I could make out the reef structure. It was a large area of big boulders and rocks. The reef was about 10 feet high and cascaded down to a coarse sand and gravel bottom at the edge.

Immediately, I saw telltale crescent shaped depressions in the coarse sand next to the reef. *Euvola diegensis* were indeed here in numbers. I decided to explore out on the reef apron about 10 to 20 feet away from the rocks. Here the sand became much softer and finer and I could find no *diegensis*. All the specimens were in the coarser sand next to the reef or in sand pockets between rocks. A few were completely exposed while most were buried just below the sand, their hiding places revealed by faint crescent shaped depressions. I collected twenty more specimens taking only the very best shells—I can only imagine how many I passed up.

All the shells I collected measured between 85 and 100 mm. Quite happy, I surfaced with my treasures. I had always considered *diegensis* very scarce. Now I had enough for a scallop dinner. How many people have had the good fortune to dine on *Euvola diegensis*? By the way, if you're interested, they were delicious.

On the last weekend of April, we went diving for the express purpose of collecting live *diegensis* for the Cabrillo Beach Marine Aquarium. The Aquarium is a non-profit educational facility located in Los Angeles Harbor. It is right next to the boat ramp where we launch. We made a quick run to the dive area and were back in a few hours with ten nice live specimens for the aquarium. They were very pleased to get them. They had never had live specimens before, although the aquarium is only a few miles from where we were collecting. The aquarium staff subsequently reported that all the specimens are doing well.

Throughout the month of April, Andy and I explored several "secret spots" outside the Los Angeles-Long Beach Harbor area. Every one of the spots yielded *Euvola diegensis*. They were more numerous on some reefs than others, but we always found them. This large area of reefs, rock piles and structures that lay in seventy to one hundred feet of water south southeast of the harbor appears to be a major habitat for this beautiful pecten.

Did I find other shells in these locations? Absolutely! In a future issue I will detail all my surprising discoveries and share with you some photographs of the remarkable finds.

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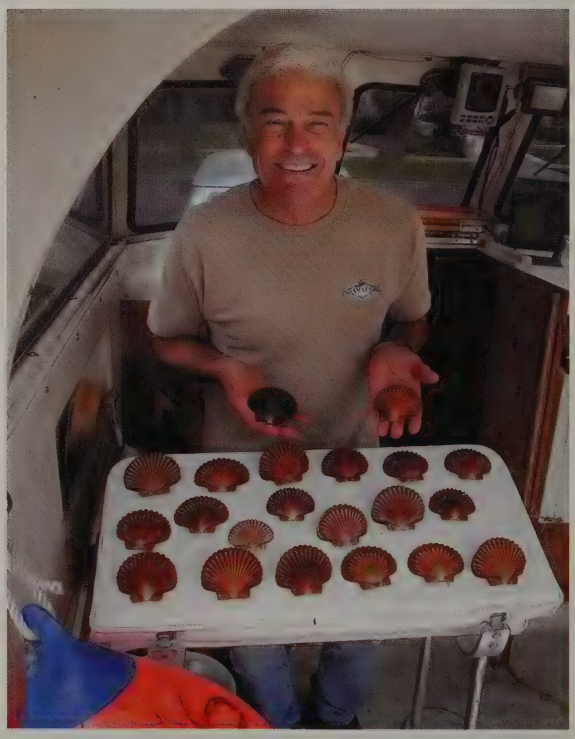
Email: *pkann@mediaone.net*



The author displays just a portion of his treasures. In all, 23 specimens of *Euvola diegensis* were found just outside the Los Angeles-Long Beach Harbor. *Photo by Dr. Andy Saxon*

EUVOLA DIEGENSIS

Specimens collected by **Paul Kanner** / Photolayout by **Jim Miller**

A. Large Nodipecten subnodosus (160mm+) from fishermen B. Conus princeps C. Conus diadema D. Oliva porphyria E. Latirus mediamericanus F. Neorapana tuberculata G. Cypraeacassis coarctata H. Small Nodipecten subnodosus (average 50-60mm) — *specimens not to scale*

Photos and layout by Jim Miller

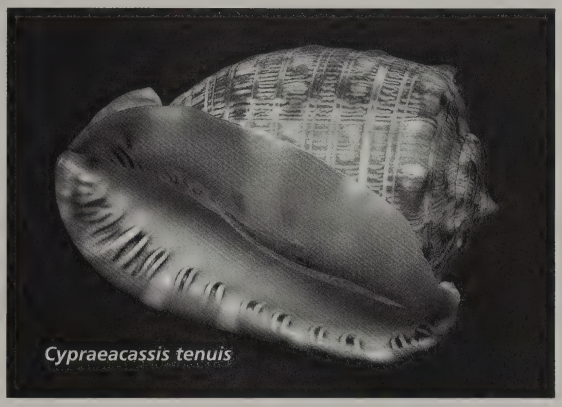
Jewels from the Sea of Cortez

— *Continued from Page 4*

even though I was more interested in shooting underwater video of the playful sea lion pups, I couldn't help but notice that there were some fairly large Murex attached to the rocks around Los Islotes, the main sea lion colony in the area. Later, while taking a lunch break on the shore of a turquoise blue lagoon, I found the bright red valve of a *Spondylus princeps* that had washed up onto the beach. On each trip we'd usually find something worth bringing back. Once we even stumbled upon a fresh dead *Nodipecten subnodosus* with both valves intact. But we never went out of our way to actually collect anything. We would just pick up something if it happened to be sitting there.

Eventually, I was bitten by the shell bug just as badly as I had been bitten back in my youth. And so, on our last trip to Baja, I was prepared to do some serious shelling. It's always wise to check with the dive operation to make sure they don't have a "no shelling" policy. Fortunately, the good folks at the Cortez Club had no problem, provided we were discreet about it and collected responsibly, as we always do.

On our very first day, we dove at Los Islotes, where the sea lions greeted us with their usual brand of curiosity and playfulness. In the rubble at the base of the island, at a depth of about 60 feet, I found a lot of single valves of *Pecten vogdesi* (mostly the flat half) and small *Nodipecten subnodosus*. I spent quite a while looking and eventually found several intact specimens of *N. subnodosus* before having to move back into shallower water, as my dive computer indicated I was running out of "bottom time." As we slowly made our way back to the boat, I spotted a few small frilly specimens of *Hexaplex princeps*.


Cypraeacassis tenuis

Interestingly, though I searched thoroughly at each dive site, *H. princeps* was the only Murex species I ever saw. We've never even seen evidence of any of the other species (such as *brassica*, *regius* and *nigritus*), not even pieces of them washed up on shore, though *princeps* is found almost everywhere and usually in large numbers. During breeding season, which seems to occur in May, you can easily find a dozen or more clustered together.

Though this particular shell does attain a length of about 130mm, these larger *princeps* are usually so heavily encrusted that you cannot even see the shell. Thus, if you want a good specimen, you need to look for the smaller ones, and even these often require a good deal of time to get clean. There are actually two color variations among the local *H. princeps*. One is predominantly white with some brown markings, while a variant with a good deal more brown pigmentation may be found at times. In my opinion, a truly fine *princeps* is among the very nicest of shells in the Murex family.

During our lunch break on the beach in one of the shallow lagoons found on the western shore of Isla Espiritu Santo, I wolfed down my sandwich so I'd have plenty of snorkeling time while just about everyone else had a leisurely meal, followed by a brief siesta. I searched along the northern side of the rocky lagoon. Though I found a number of broken shells, the only "keeper" I found was a good-size *Neorapana tuberculata*.

This shell is very close in form to the more southerly species, *N. muricata*, which Paul Kanner and I found in Panama earlier that year. Some authors feel these are both the same species, merely variants based upon location. However, Myra Keen, in her *Sea Shells of Tropical West America*, lists them as distinct. You can judge for yourselves from the photos. Like *Hexaplex princeps*, this is another shell that often requires many hours of cleaning, making gem specimens somewhat of a rarity. Surprisingly, I also found two more specimens that night during low tide on the rocks right outside our hotel, along with large numbers of *Nerita scabricosta* and even a few small *Conus tiaratus* in some of the sandy tide pools.

The following day was to be one of the most exciting of the trip. We were doing our first dive on the east side of Espiritu Santo, where there is a fairly steep drop-off to a depth of about 95 feet. There the huge rock formations are covered with beautiful yellow sea fans. Though mantas are often sighted here, we saw none, but as we neared the 90 foot mark, I did spot a single specimen of *Latirus mediamericanus* sitting atop some rubble, as well as another dead but intact *Nodipecten subnodosus*.

As we reached the base of the island at 95 feet, we could look out and see the gently sloping sea floor which disappears into the darkness. The rest of the group started back up but something told me to stay and look. As I slowly swam out over the silty bottom, I saw the remains of tremendous numbers of large rock oysters (*Ostrea* species). But as I looked more closely, I saw what appeared to be movement on one of them. Were my eyes playing tricks or were those actually spines protruding from atop one of the oysters? I lifted the valve for a closer inspection and indeed, there attached to the oyster shell was a live *Spondylus princeps*!

I'm sure I let out a "whoop" underwater. I had at last found a living *Spondylus*, and though it was heavily encrusted (as you'll note is the case with most of the shells I found during this trip), it appeared quite spiny and there was some red color showing where the marine growth had not yet covered it.

Now we all know that where there is one shell, there are quite often others. So I looked at the next oyster valve and was stunned to see that it, too, was topped off with a live *Spondylus*. My heart was pounding by this point. As I checked my dive computer, I saw that I was into the red zone, meaning I had to get to shallower water very soon. But as I looked further, I began to see more and more *Spondylus*. I realized at that second that what I was actually looking at was a sea floor that was a veritable garden of *Spondylus princeps* stretching off as far as I could see. It was absolutely astonishing! Here I had assumed that one might be lucky to see a *princeps* attached to some rock formations, but I had been looking in the wrong place.

My wife and dive buddy (being the smart one in the family) pointed at my dive computer. I knew that I had pushed us to the limits and we'd have to do a decompression stop, but I quickly took a last look and picked up two more *Spondylus*, one of which appeared to be pure white, then began heading back up to shallower water. Had we wanted to, I'm certain we could have literally filled our boat with *Spondylus* and still not made a dent in that population.

Once we were back onboard, I gently wrapped each specimen in a fold of the big beach towel we always bring. During lunch I would pack them more securely against the chance that we might have a rough ride back in later that day. I might point out that the seas in the Gulf of California are a lot like those of the Gulf of Mexico where we often dive. One day can start out with whitecaps, then end up with the waters as smooth as glass. Other days will be just the opposite.

We had lunch that day at the southeastern point of the island at a place called Bonanza Beach. After securing my *Spondylus* and putting away a veggie sandwich in record time, I went out to snorkel. I found no shells here, though I did see plenty of gorgeous tropical fish and even some jeweled morays.

Our second dive was in shallower water at a spot called Naked Lady. Though

I did not find any shells of note here either, the sheer rock faces are covered with purple sea fans and there were plenty of interesting fish to watch and photograph. No matter, as I had found *Spondylus* that day!

The following morning we were followed out from the dock by some playful dolphins. We planned to dive the wreck of the *Salvatierra* which lies in the San Lorenzo Channel, the body of water that separates Espiritu Santo from the mainland. Here the cargo ferry *La Salvatierra* sank in 1976, moments after striking Swanee Reef (subsequently fitted with a warning light) and of the hundreds of passengers, not one life was lost. The insurance company actually paid everybody for their losses—to the tune of 50 pesos (or about five cents) each! The *Salvatierra* is lying on a sand bottom in 60 feet of depth, and is approximately 70% intact with both propellers exposed. Many of the trucks that were her cargo are still visible and their tires remain inflated to this day. The wreck has formed an artificial reef, attracting a wide variety of sea life.

As always, there's a hefty current running here, so we all got down below the profile of the wreck to give us some protection. You blow through air fast when fighting a stiff current underwater. Once we were down at the base of the wreck, we started exploring. I found a few dozen single valves of *Argopecten ventricosus*, of which I later was able to match up three pairs, and a few more nice specimens of *Hexaplex princeps*. Supposedly, on a night dive, someone found a monster *Cymatium parthenopeum keenae*, a distinct geographical form recognized by Beu in 1970. I searched in every nook and cranny and though I saw several octopi, I didn't spot any Cymatiums. The highlight of the dive was a small sea turtle which swam over to have a closer look at us, as well as the thousands of fish that use the wreck as protection.

On the left is *Neorapana muricata* from Panama, while the two on the right are *N. tuberculata*, which some feel may be a subspecies.

After a leisurely lunch (and snorkeling for me), our next dive was at a site called Isla Ballena (or Whale Island, thus named for its shape). We decided to let the group go off to visit the two caves at the base of this island we had visited on each of our previous trips, while we went off into deeper water to look for a colony of garden eels. We never did see any eels because my eyes were drawn to a large area of old oyster shells. Remembering what we had found before in such an area, we thought it was worth a look. At almost exactly 65 feet, we began to find *Spondylus* on the oysters. There were not nearly as many as we had seen at the previous site, but we still came back with three fine specimens.

Since our first dive had been rather deep, we didn't have a lot of bottom time, so we reluctantly headed back into shallower water. Here I was fortunate enough to find a live orange *Conus princeps* (yes, a lot of the shells in this area are named *princeps*) as well as an empty *Cymatium parthenopium keenae* with some of the stiff periostracum still attached.

Over the next few days, we hit several other dive sites, including Isla Cerralvo (where the visibility was an astounding 120 feet or more) and El Bajito, a small seamount close to the sea lion colony. The more famous dive site, El Bajo, where the schools of hammerheads are sometimes seen, is much farther out in the open ocean and is a fairly deep dive, so you don't get much bottom time. Some terrific currents there can easily whip you far out to sea if you are not careful. We had dove there previously and elected not to do that dive on this trip, even though El Bajo is a great spot where you're guaranteed to see amazing numbers of huge green moray eels.

On our second visit to Los Islotes, we were treated to a magical encounter at about 40 feet with a pair of giant Pacific Manta Rays. I was turning over rocks when something big and dark appeared in the corner of my eye. Margo was about 10 feet away taking pictures of some Cortez Angelfish. I screamed as loud as I could underwater. Fortunately she heard me and turned around. At first she gave me a "what's up?" look, but then she saw what was passing by a bit farther out. I have never seen her swim as fast as she launched herself towards the huge rays. But as hard as she kicked, she couldn't keep up with the giants, and though they hardly appeared to be exerting any effort at all, still they sped ahead of us. Fortunately, one of them turned and swam directly over our heads, allowing me to capture that incredible moment on video.

Upon our return to the Cortez Club dock, one of the owners came over to ask if I wanted to take video of some giant seahorses. Naturally I did, so one of the crew went off to fetch my dive gear. I thought maybe we would be getting back in the boat to go to some remote location, but they helped me into my gear and told me they had found three of these fascinating creatures down near the bottom of the pilings supporting the floating dock. I did get great shots and one of the large males was "pregnant" (male seahorses carry the eggs in a pouch, much like a kangaroo). I even got a chance to get face-to-face with a large green moray which makes its home inside a piece of concrete pipe right beside the dock.

The other highlight of our trip was the startling discovery of large *Oliva porphyria* in some sandy areas out in the San Lorenzo Channel. While not quite as exciting as finding the *Spondylus* on our first day, this was still quite a thrill. Plus we also got a chance to see an enormous colony of garden eels in that same area. And later in the day, we braved the afternoon heat and went into town where we found a shop that had a huge number of large *Nodipecten subnodosus* for sale, many of which were a solid dayglow orange. As best he could, the shop owner told us that fishermen brought these to him.

On our final day, we rented our own panga and had the captain take us back to Whale Island for a few more *Spondylus*. We would have preferred to return to our first *Spondylus* spot, but since we were flying out that next morning, I didn't want to risk diving too deep for too long. The rest of the day we spent snorkeling in the crystal clear waters of several lagoons. I was fortunate enough to find two more *Conus princeps*, a large *C. diadema* and a nice *C. brunneus*, as well as a freshly dead *Nodipecten subnodosus* about three inches (75mm) long.

My only disappointment was that I never found any live *Argopecten ventricosus* or *Pecten vogdesi*. Still, when you figure what we found in *Spondylus* alone, it was well worth the trip. Add to that the great diving, underwater encounters with all manner of sealife, the wonderful people we always meet in Baja, and the great meals (shockingly inexpensive), and you have the makings of a perfect vacation. I hope my photographs do justice to the beauty of the shells I found on this marvelous adventure. Cleaning the *Spondylus* alone took every bit of two weeks, but they were clearly worth every bit of effort (see photos on Page 5).

As always, my only regret is the fact that we eventually have to leave a place that is so special to us and return to our "normal" lives. But there is always the anticipation of our next trip to Baja to keep us sane. And there are the gorgeous shells on our mantel, reminders of our incredible time diving in Mexico's magical Sea of Cortez.

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The saga of three ranellid species in the western Atlantic

by Emilio F. García

Last October I had the opportunity to attend the shell show in Clute, Texas, organized by the Sea Shell Searchers of Brazoria County. Among the many fine exhibits, there was a most interesting, one-case exhibit presented by Mr. Roe Davenport Jr. of San Antonio, Texas. In it were shells he had collected in South Padre Island, Texas. Surprisingly, there were a number of specimens representing eight species of Ranellidae, a family whose members, even the more common ones, are not easily found on the beaches of the northwestern Gulf of Mexico. These ranellids were *Cymatium aquatile* (Reeve, 1844), *C. corrugatum krebsii* (Mørch, 1877), *C. muricinum* (Röding, 1798), *C. nicobaricum* (Röding, 1798), *C. parthenopeum* (von Salis, 1793), *C. martinianum* (d'Orbigny, 1846), *Linatella caudata* (Gmelin, 1791) and, the most interesting, a *Cymatium* 'species' that attracted me to the exhibit several times, dragging Roe along to ask him various questions.

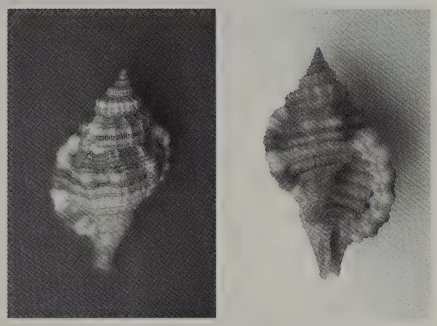

Fig. 1- *Cymatium tranquebaricum*, South Padre Island, Texas- 35.1 mm (Davenport coll.)

Many specimens, although crabbed, were in gem condition yet still possessed intact protoconchs. To add to the puzzle, a number of the species in the exhibit, such as *Cymatium corrugatum krebsii*, live in rather deep water, but the material had been collected at low tide, on sand flats, in the bay side of the island! Trying to reconcile the variety and quality of the shells, the deep-water habitat of some of the species, and the collecting locality, we presume that some of the trawlers from the area cleaned their nets just offshore, the currents brought the specimens (winnowed with the bycatch) closer in, and the hermit crabs and Roe's collecting ability did the rest.

After returning home, still intrigued by the identity of the unidentified *Cymatium*, I asked Roe to send me the specimen to see if I could identify it. We had eliminated the taxa that were already in his exhibit and, searching through the classic ranellid literature of the western Atlantic, I could not find many more available names that would remotely fit the specimen.

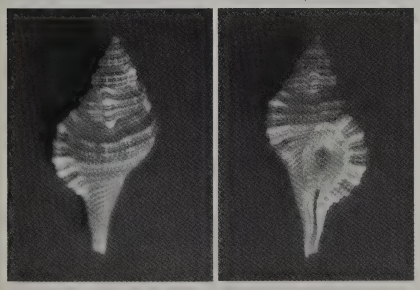

Fig. 2- *Cymatium vespaceum*, Roatán I., Honduras- 40.6 mm (Piech coll.)

When I discussed my dilemma with Dr. Harry G. Lee, of Jacksonville, Florida, he suggested the taxon *Cymatium tranquebaricum* (Lamarck, 1816), a west African species reported by García-Talavera (1981) from Venezuela, which Ted Kalafut, the well-known Florida SCUBA diver, had found in a lobster trap set off Stock Island, outside Key West, Florida. His single specimen had been identified by Dr. Lee, who mentioned a small article Ted had written in *American Conchologist* concerning his find (1988).

With this idea in mind, I first went to the two *C. tranquebaricum* specimens in my collection, one from Guinea and one from Western Sahara. Both of my specimens were white, much larger and considerably lighter in weight than Roe's specimen (Fig. 1). They also lacked the profuse axial sculpture that his specimen exhibited. Despite these differences and the quite different markings, the crisp, bifid spiral cords with wide interspaces were common to the west African and Texan specimens.

My next step was to check Henning & Hemmen's (1993) treatment of the taxon in question. Although their description closely followed my west African specimens, they described under 'Remarks' a variety of *C. tranquebaricum* from the Cape Verde Islands "with stronger sculpture, varices at earlier stages of growth and a much smaller size." This variety, named *Cymatium problematicum* by Dautzenberg & Fischer, conformed to Roe Davenport's specimen. When I finally went to Ted's article, I saw that, although his specimen was white, it otherwise seemed to be the same taxon. To make sure, I decided to send the shell to Dr. Lee so he could compare it with specimens from his extensive collection.

Harry's reply was most interesting. Not only did he corroborate the ID, but remarked that Roe's specimen was exactly like a Cape Verde specimen he had in his collection, right down to the light orange coloration of the siphonal canal. I have now seen Harry's specimen and agree with his conclusion. Since Roe has informed me that another collector has also found a fresh specimen like his in the same area, there is no doubt that the geographical distribution of *C. tranquebaricum* can now be extended to the northwestern Gulf of Mexico.

Although the feat of endurance of the larva of *C. tranquebaricum* seems imposing at first, other ranellid species have a type of larva that can survive for much longer periods of time and can therefore be carried even longer distances by ocean currents. Because of this trait, many ranellids are distributed worldwide, hindered only by adverse ecological and/or climactic characteristics. Such is the case of *Cymatium (Turritriton) comptum* (A. Adams, 1855), and *C. (T.) vespaceum* (Lamarck, 1822).

The distribution and identification of these two western Atlantic ranellid species have been the subject of confusion and many heated discussions among collectors because of the superficial similarity in their shell characters and their erroneous

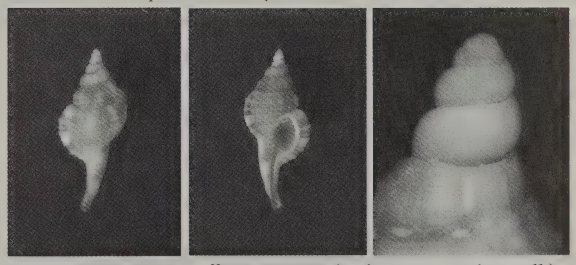

Fig. 3- *C. vespaceum*, off Cartagena, Colombia-20.8 mm (Lee coll.)

treatment in illustrations and geographical distribution in such well-known publications as *Johnsonia, American Seashells, Coastal Brazilian Seashells*, and *Compendium of Seashells*. In 1957 Clench and Turner figured in *Johnsonia* a specimen of *C. (T.) comptum* as *Cymatium (Septa) gemmatum* Reeve, 1844, an Indo-Pacific species that has not yet been found in the Western Atlantic. Later on, in 1974, R. Tucker Abbott reproduced in *American Seashells* the picture that had appeared in *Johnsonia* as *C. gemmatum* under the name *Cymatium vespaceum*. To complicate matters, the figure was erroneously numbered 1754, when it should have been 1755. However, in 1982 Abbott and Dance did illustrate a specimen of *C. vespaceum* in their *Compendium of Seashells*, and established its Western Atlantic distribution as "North Carolina; Bermuda to Brazil."

The Brazilian extension was probably due to the fact that, in 1970, Dr. E. C. Rios had published in *Coastal Brazilian Seashells* a dorsal view of *C. "vespaceum"* as occurring in Amapá, northern Brazil but, once again, illustrating a specimen of *C. comptum*. This error was corrected in Rios' 1985 publication, *Seashells of Brazil*, where he illustrates and identifies as *C. comptum* what seems to be the ventral side of the same specimen of his 1970 publication.

Also in 1985, the Ranellidae expert A. G. Beu published in our journal, then called *Conchologists of America Bulletin*, "A classification and catalogue of living world Ranellidae (=Cymatiidae) and Bursidae." In it, presumably because the speci-

mens illustrated in *Johnsonia*, *Coastal Shells of Brazil*, and *American Seashells* referred to *C. comptum*, and notwithstanding Abbott and Dance's distributional claim and correct illustration of *C. vespaceum*, Dr. Beu confined the geographical distribution of *C. vespaceum* to the Indo- West Pacific.

Although the two species in question are similar, *C. comptum* differs from *C. vespaceum* in having more tabulated whorls and more prominent axial ribs which create large knobs on the body whorl. It is usually smaller than *C. vespaceum* and more fragile in general appearance. Moreover, in adult specimens of *C. vespaceum* the spiral cords are widely spaced, crisp, and narrow.

While adult specimens of the two taxa are easily separable, some young specimens of *C. comptum*, particularly those in the western Atlantic, are almost indistinguishable in general characteristics from *C. vespaceum*, and the only reliable means of separating the two taxa is the difference in their protoconch. The protoconch of *C. vespaceum* (Fig. 3c) is narrower and somewhat longer than that of *C. comptum* (Fig. 6c), and tends to be less pyriform and have more convex whorls with deeper sutures. Dr. Harry G. Lee has measured the protoconch of both taxa and has found that, at least in western Atlantic specimens, *C. vespaceum* has 3/4 more whorls than *C. comptum*.

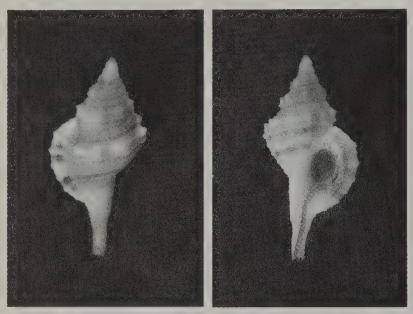

Fig. 4- *C. vespaceum*, Bequia Is., Lesser Antilles- 18mm (Sunderland coll.)

The difference between the two species did not go unnoticed to the sharp eyes of Mrs. Betty Jean Piech, our own ranellid specialist who, in 1993, validated the occurrence *of C. vespaceum* in the Western Atlantic. At the time, she had in her collection a specimen collected by herself in Roatán Island, northern Honduras (Fig. 2) and had spotted another specimen in the Sunderland collection from Pickles Reef, off Key Largo, Florida. Although Henning and Hemmen published their monograph , *Ranellidae and Personidae of the World,* in the same year as Mrs. Piech's article, they were aware of it, as it appears in their bibliography. However, they again restricted, without comments, the geographical distribution of *C. vespaceum* to the Indo-Pacific.

It wasn't until 1998 that Dr. Alan Beu, in his *Indo-West Pacific Ranellidae, Bursidae and Personidae*, recognized Betty Jean's finds and extended the *C. vespaceum* known range, while stating that it "is virtually unknown in the western Atlantic." Dr. Beu continues by saying that "the lower figure identified as *Cymatium occidentale* by Oliveira & Trinchão (1993: fig. 2.2) appears to show *C. vespaceum* from Brazil." So, perhaps, after all, this species has been found in that country and, once again, has been erroneously identified.

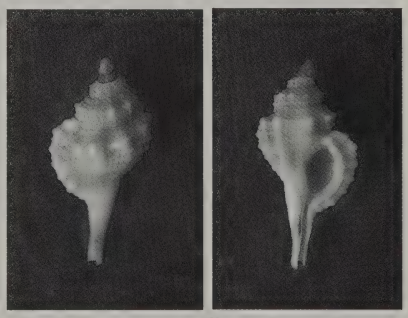

Fig. 5- *C. vespaceum*, off Palm Beach, Florida- 17.4 mm (UF 127165)

After Betty Jean's 1993 publication validating its occurrence in Honduras and off Key Largo, and Dr. Beu's comments about its possible occurrence in Brazil notwithstanding, no other reports of *C. vespaceum* have been validated according to Dr. Gary Rosenberg's exhaustive list of western Atlantic gastropods (see references).

Trying to update the occurrence of *C. vespaceum* in the western Atlantic, I asked some collectors with large western Atlantic collections to send me their specimens of *C. vespaceum* from localities other than the Florida Keys or Honduras. Dr. Harry Lee sent a specimen collected off Cartagena, Colombia (Fig. 3), in a lobster trap set in 60 m; Kevan and Linda Sunderland sent a pair, one dead and one live-collected (Fig. 4), from the island of Bequia, off St. Vincent, Lesser Antilles, in 20 m, in grass; and Mrs. Edith Chippeaux has in her collection a specimen from Cat Cay, Bahamas. I also asked Mr. John Slapcinsky, of the Florida Museum of Natural History, if I could borrow the specimens of *C. vespaceum* housed in the Museum. This yielded a number of specimens of this species from the McGinty and Kennedy collections found in Palm Beach Co., southeast Florida between 1960 and 1971. All of the specimens were collected dead, either at the beach or offshore. A specimen from lot FL127165 is shown in Fig. 5. Finally, a specimen in the Bailey-Matthews Shell Museum was labeled "east Florida."

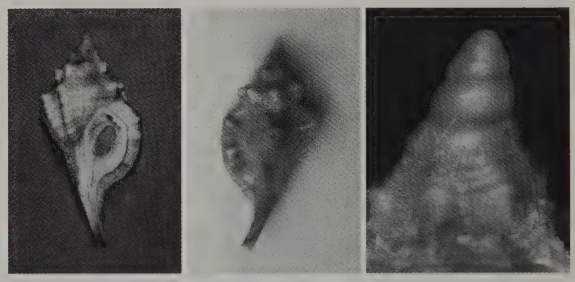

Fig. 6- *C. comptum*, off west Florida, in 40 m -31.2 mm (García coll.)

It is obvious that *C. vespaceum* is a rare species in the western Atlantic. Most of the specimens of "vespaceum" that I requested from friends and institutions turned out to be *C. comptum* (*C. corrugatum krebsii* in two instances and *C. pfeifferianum* in another), most probably misidentified because of the erroneous treatment of the two taxa in literature. Besides the live-collected specimen of *C. vespaceum* in the Sunderland collection, the closest to live-collected was Betty Jean's specimen from Honduras. While I was in the process of studying it, an operculum dropped from its aperture. All others have been collected dead, and all of the fresher specimens, except Betty Jean's, are presumed juvenile because of their small size and lack of mature coloration.

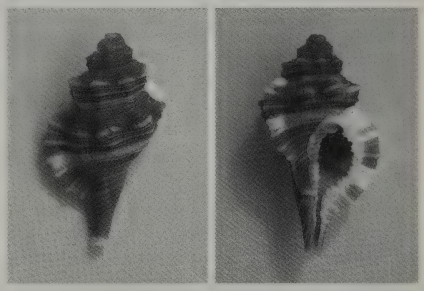

Fig. 7- *C. comptum*, melanistic form, Pompano, Florida- 22.5mm (Sunderland coll.)

From the records at my disposal, it seems that C. vespaceum occurs in the southern Caribbean, and as far north as Honduras in the western portion. Vokes and Vokes (1984) did not list it as part of their Yucatán findings. With the findings in Bequia, the Bahamas and southeastern Florida, one may presume that this taxon will eventually be found in intermediate areas. Moreover, considering the amazing survival properties of its veligers, Dr. Beu's suggestion notwithstanding, it is also logical to presume that *C. vespaceum* will be found both in Brazil and the Gulf of Mexico.

In the *comptum–vespaceum* complex there is a form that has been called "melanistic *comptum*." I have large specimens from the Philippines in my collection, and I have also seen examples in Betty Jean Piech's collection from Mozambique and N.E. Australia. It is not uncommon in the western Atlantic. Betty Jean has a specimen from Roatán Island, NE Honduras; the Florida Museum of Natural History has specimens from off Palm Beach, Florida, and from the island of Tobago, in the Lesser Antilles; and the Sunderland collection has a dead-collected specimen from Pompano Beach, Florida (Fig. 7). This form is similar in coloration to the recently described *Cymatium indomelanicum* García-Talavera, 1997, with which it has been confused. García-Talavera also compares the new taxon with melanistic *C. vespaceum*. These latter two taxa are very closely related, and may one day prove to be synonymous. However, I have not seen melanistic *vespaceum* from the western Atlantic.

In some collections *C. comptum* has been identified as *C. gracile* (Reeve, 1844). However, Beu (1998:99) considers Reeve's syntypes of this taxon to be juvenile specimens of *C. pfeifferianum* (Reeve, 1844) (Fig. 8). *C. pfeifferianum* has also been found in the western Atlantic, from Brazil (Oliveira & Trinchão, 1993) to western Florida (Piech, 1993:90). Young specimens resemble *C. vespaceum* in general shape but the large, wide protoconch (Fig. 8c) immediately distinguishes it from similar species.

Harry Lee has analyzed the original description and illustration of *Triton ridleyi* E. A. Smith, 1890 and concluded this 19 mm Fernando de Noronha specimen is *C. comptum*, NOT *C. sarcostoma* (Reeve, 1844), as suggested by Henning and Hemmen (1993:84).

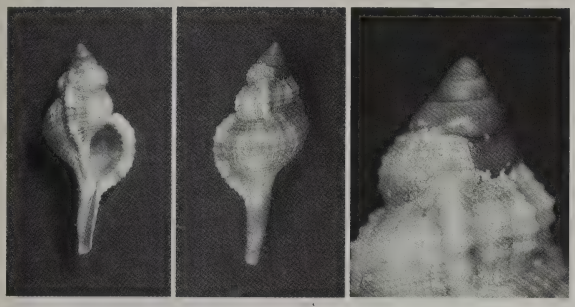

Fig. 8- *C. pfeifferianum*, locality unknown- 19.5 mm (Sunderland coll.)

This article was inspired by Mr. Roe Davenport's remarkable find and his willingness to lend me his specimen for study. My deepest thanks to him and to Dr. Harry G. Lee, whom I consulted throughout the preparation of this paper, and who has read the final draft. Also my gratitude and thanks to Mrs. Betty Jean Piech, who sent me all of her worldwide specimens of *C. vespaceum* and melanistic *C. comptum* for study, as well as copies of several ranellid papers needed for this study; and to Mr. John Slapcinsky and the Florida Museum of Natural History, Kevan and Linda Sunderland, Mrs. Edith Chippeaux, and Mr. Doug Shelton, who did not hesitate to lend me the specimens I requested. Dr. José Leal, director of The Bailey-Matthews Shell Museum, gave me access to the museum collection.

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Mid-Atlantic Malacologists in Delaware

Mollusk enthusiasts converged at the Delaware Museum of Natural History (DMNH) on 10th March 2001 for the Fourth Annual Meeting of the Mid-Atlantic Malacologists. The 27 participants included amateur and professional malacologists, graduate students, and workers from federal and state agencies who came from five states, Maryland, Delaware, Pennsylvania, New York, and New Jersey, for this one-day meeting.

There were participants from five local shell clubs including Wilmington Shell Club, Jersey Cape Shell Club, Central Pennsylvania Shell Club, New York Shell Club, and an especially strong showing from the Philadelphia Shell Club. The seven talks and three posters spanned the three major molluscan classes, gastropods, bivalves, and cephalopods, and led to lively discussions.

After the meeting, 14 participants spent several hours using the extensive mollusk research collections and library at DMNH. Overall the meeting was very successful, with ample opportunity for people to meet and catch up with colleagues.

TALKS: Timothy A. Pearce – Update on the Delmarva Land Snail Project. Tim is continuing to map distributions of land snails on the Delmarva Peninsula. He has doubled the number of land snail species known from Delaware.

Paula M. Mikkelsen - Searching for Pearls: the research behind an upcoming exhibit at the American Museum of Natural History. Together with three other curators, Paula has been working on a pearl exhibit that will open in October 2001 in New York (closing at The Field Museum, Chicago, in January 2003). Paula discussed and showed photos of a variety of pearl culture methods from around the world including techniques for marine and freshwater pearls. **Aydin Örstan** – Mutants from the back yard. Toothed and untoothed forms of the land snail *Neohelix albolabris* occur together in Maryland. Toothed forms from a given locality tend to be larger than untoothed forms. He is examining penial sculpture to check if they are the same species. **Robert Robertson** – Gastropod higher taxa: a tale of five characters. The five characters (pigmented mantle organ, ciliated strips, chalazae, heterostrophy of the larval shell, and water repellency of the larval shell) show some use in separating traditional prosobranch and euthyneuran taxa, although some taxonomic groups have characters of both prosobranchs and Euthyneura. **David Campbell** – Bivalve Phylogenies: comparison of morphological and molecular results. Results from molecular studies don't always match conclusions from morphological studies. Molecular results from 18S DNA suggest that many traditionally recognized groups are not monophyletic. **Elizabeth K. Shea** – The proboscis of ommastrephid squid paralarvae. In this family, the paralarval proboscis is a complete fusion of the two long tentacles. As the paralarva develops, the proboscis becomes shorter, and by the end of the paralarval development, the proboscis has split to form the two long arms. Liz is putting together a paper on this subject for *American Conchologist* that should be ready within the next few months. **Charles Sturm** – *The mollusks: guide to their study, collection, and preservation*. Charlie gave an update on this book he is editing. Many authors have already completed their chapters, while other chapters are still in progress. Many people and organizations have expressed interest in the book. The book will probably be available in 2002.

POSTERS: David Campbell – Phylogeny of fossil and Recent Bivalves using about 250 morphological characters, shows support for many traditionally recognized groups. **Jay Cordeiro** – Freshwater Bivalve Mollusks of the Sangha River, Central African Republic. A 1998 expedition from the American Museum of Natural History collected five species of the families Etheriidae, Mutelidae, Sphaeriidae, and Unionidae along the Sangha River and its tributaries. **Eric J. Chapman and Robert S. Prezant** – Freshwater Mollusc survey at West Point Military Academy. They performed a qualitative survey of lakes, ponds, streams, and roadside ditches using SCUBA, dip nets and seine nets. To date they have found more than 30 species including the two unionids *Pyganadon cataracta* and *Elliptio complanata*.

OTHER PARTICIPANTS: Susan Campbell, Mel Carriker, Albert F. Chadwick, Clem Counts, Maria Counts, Louise Crowley, Phil Dietz, Judy Goldberg, Sue Hobbs, Rich Kirk, John Kucker, Lois Kucker, Elaine McDonald, Mick McLaughlin, John Plummer, Happy Robertson, John Wolff.

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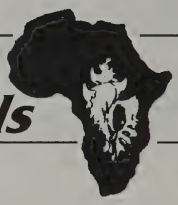

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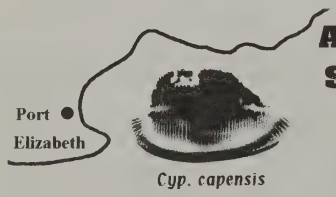

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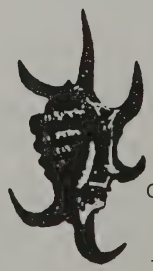

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Some Oliva species of the Mid-Pleistocene of southern Florida

by Allen Aigen

Introduction: It can be very difficult to distinguish modern closely related *Oliva* species, as they differ subtly between species and can vary widely in some characteristics within a species, especially between populations. Fossil olives, which lack original color and pattern, usually even with UV light, can cause no end of uncertainty, and require detailed descriptions or statistical analyses to identify accurately. This article deals with 6 common to rare named *Oliva* species from one locality in southeastern Florida. Popularly known as South Bay, this location (the North New River Canal levee about 1-2 miles, or 1.5-3 km, south of South Bay, Palm Beach County) primarily contains the middle Pleistocene Bermont Fauna of the Okeechobee Formation of Scott (1993) and Petuch (1994). This is better known as the Bermont Formation of DuBar, 1974. I have a large collection of olives from this location, but not all the named Bermont forms are found there. For a summary of the locality, and the stratigraphy, see Aigen, 2000.

This article does not name new species, and only suggests synonomies. I use the species names as described, and try to further compare and clarify the populations. The chart that follows will help you to compare the six species referred to this location. However, I believe that careful statistical work will show that there are actually only two very variable species here, both of them within the variations of modern Florida species. Three other described Bermont species will await a further study. A dichotomous key is also provided but is useful only when the protoconch is well preserved.

(Top, left to right) *O. lindae*, 31mm; *O. cokyae*, 31mm; *O.lindae*, 37mm; *O. cokyae*, 38mm (Bottom, left to right) *O. edwardsae*, 42mm; *O. sayana*, 45mm, *O. sayana*, 45mm; *O. edwardsae*, 48mm.

There are basically two current models used in the description of molluscan species based upon shell characteristics (morphospecies). The first model describes as a distinct species any population that includes members with a "distinct form," where the population can be shown to be significantly different from its neighbors. There may be minor overlap of individuals that cannot be separated from other species on the basis of shell alone, but the populations as a whole are distinct and separable, and thus considered to constitute objective species that deserve names. This has been the dominant model until fairly recently, and is still used by many malacologists (who are now, however, generally referred to as "splitters"). The naming of species based upon only a few specimens rather than large populations and comparing these few specimens to only a few type specimens of other species, uses this "distinct forms" model.

However, with the advent of personal number crunching computers over the last twenty or so years a new model has become the standard (Actually it has been essentially, but less rigorously, in use for hundreds of years). Populations that cannot be completely statistically separated are considered to be the same species. Even though the populations as a whole easily can be distinguished, they are considered to be variant populations of the same species, due to the presence of overlapping, indistinguishable forms in each population (or in intermediate populations). This "overlapping forms" model was used by Tursch et al (1998) to synonymize 41 previously valid species names with *O. fulgurator* (Röding, 1798), four valid names of *O. sayana* Ravenel, 1834 and three valid names of *O. scripta* Lamarck, 1811, thereby reducing the Western Atlantic to only three objective species. Of course people who follow the "distinct forms" model say that this leads to "lumping" of species that can, and should, be separated, and that the information lost by the said lumping is important. This study examines the use of both models, and suggests synonomies. I did not, however, do the very detailed measurements (about 30 per shell) and statistical analyses necessary to rigorously prove my hypotheses using the "overlapping forms" model, as I lack the necessary time, tools and expertise.

When possible, I try to collect at least 100 olives at a site where they are common, because I cannot be sure of the species until I can clean them and lay them side by side in size order. I take any well-preserved specimen and try to get many of the small ones (whether immature specimens or small species) as well as the largest, and anything odd looking. As the area in question was well picked over before I got there (collecting over a few years), my sample is probably skewed toward the smaller and the more common forms. But since olives were abundant, I assume I collected a fair representation.

Although there is no agreement as to what should constitute a subgenus in *Oliva*, the subgenus *Strephona* Mörch, 1852, is commonly used to include the Western Atlantic olives, and all of the species dealt with here. They are generally 25 mm to 100 mm long at maturity (at least 5 post-protoconch whorls), elongate to rounded-barrel shaped. A combination of overall shape and size, shape of the apex and of the protoconch, details of the subsutural channel, associated callus, and columellar teeth have been used to distinguish species. Collectors of recent olives also rely heavily on color patterns. These have proven to be more useful than overall shape for the common Western Atlantic species *O. fulgurator* (Roding, 1798)(= *O. reticularis* Lamarck, 1811). This species has been shown to consist of numerous distinct colonies (many of which have been named) that overlap in all measured characteristics (morphometrics) when enough specimens have been considered. Overall shape varies from short and rounded to narrow and elongate, with high to low spires, but all the forms effectively overlap and form one objective species (Tursch et al, 1998).

There are objections to using morphometrics exclusively. Although this tool has been shown effectively to separate Olive species, independently of anatomical studies (personal communication, Yuri Kantor, 2001), the more tools that are used to describe and understand the populations, the more certainty there will be that we have accurately assigned names. Anatomical and biochemical studies of the western Atlantic species have not been done, and may contradict the morphometric results. Of course fossils have only morphometrics available, but if morphometrics were proved to be inadequate to separate the recent species, there would be less reason to assume that the fossils should be considered populations of recent forms.

Fossil *Oliva* species cannot generally use the clues of color patterns which have been proven useful in the Recent Western Atlantic forms. Unfortunately, most of the preserved details are fairly variable within a species, and vary subtly between species. Because some species vary widely in shape (especially spire height), details of the protoconch, callus, channel and teeth (in that order) should take priority in determination. Note that the teeth on and near the suprafasciolar band are generally distinctive within a fairly narrow range of shapes and numbers, at least within a local population. The teeth at the posterior end are usually narrow and not distinctive. Teeth on gerontic specimens may get callused over and hard to distinguish. Immature specimens in this group have relatively sharp, narrow teeth, barely showing adult characteristics. They also have relatively thin shells, and may vary slightly in shape from the adult form. A mature shell has at least 5 post-protoconch

whorls. In maturity, the height of the lip generally elongates. The extreme is seen in specimens where the lip practically covers the preceding whorl. I count maturity as starting with the change in slope of the subsutural edge of the body whorl from down toward the aperture to up toward the apex. This is not, however, seen consistently on all species.

Species descriptions

***O. edwardsae* Olsson, 1967,** is one of the two abundant species at the site. This species was described from the Belle Glade pit, about 4 miles (6.4km) east of the South Bay site. Hoerle (1970) documented the Belle Glade pit, which is comparable in fauna to South Bay, in a molluscan faunal list. She reported only two *Oliva* species: *O. edwardsi* Olsson, 1967, and *O. sayana* Ravenel, 1834, from the Recent faunas.

Petuch (1991) amended the gender from *edwardsi* to *edwardsae* to correspond to the sex of the collector, Corinne Edwards. He pictured one specimen (1991, 1992 and 1994) that he referred to as *O. edwardsae*, probably correctly. (The teeth are not visible and details of the spire are vague. However the stepped pattern of the spire and the even stoutness of the body whorl do indicate *O. edwardsae*.)

The 108 mature *O. edwardsae* in my collection from South Bay vary from 27.5 mm long and 12.4 mm wide, to 48 mm long and 21 mm wide with at least 5 post-protoconch whorls, and at least the beginning of a widening lip. The apex varies from 12% of the height to 24%. The holotype is 44 mm long, and 19.4 mm wide, with an apex of about 21% of the height. (I also have 66 immature to submature specimens down to 9 mm long.) Not all mature specimens will show a widening lip. A 36 mm long specimen of 5 1/2 whorls does not.

This form has a relatively large, flat, approximately 2 1/2 whorl protoconch. It also has a slightly convex callus that goes smoothly down into the channel, so that looking closely at the apex, with the shell held vertically, there is no vertical notch or indentation in the profile. (Best seen opposite the aperture--See Fig.1). There generally will be a stepped apex, however, as there is a lateral gap formed by the canal at the suture. (Note, however, that the very low spired forms have the edge of the callus more visible although not obvious, and a smoother apex than the higher spired forms.) The teeth are generally wide, blunt and flat, often doubled. The apex is convex-conical to very low. Although Olsson (1967) noted the black color of specimens from the Belle Glade pit, that is a secondary characteristic, rarely found at South Bay or other localities. The strong luster, which he also notes, is typical of most olives, but the preservation at South Bay is not always as good as it was at the Belle Glade pit. Olsson also noted that the species is remarkably constant in its shape. Either there is much more variability at South Bay than at Belle Glade, or more likely, mostly large, "typical" specimens were collected to represent the types that Olsson examined and based his description on. This species is also common in many other Bermont localities, and apparently has a wider range of forms than exhibited at South Bay.

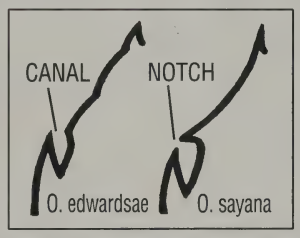


Figure 1. Diagrammatic cross-section of *O. edwardsae* (left) and *O. sayana* (right) at posterior canal of body whorl, 1/2 whorl from aperture.

O. edwardsae is apparently a local, time-restricted variety of *O. fulgurator* (as redefined by Tursch et al, 1998). In overall shape, the low spired form is very similar to such forms of *O. fulgurator* as *O. contoyensis* Petuch, 1988. The high spired forms are most similar to *O. reticularis bollingi* Clench, 1934, which was also synonomized with *O. fulgurator* by Tursch et al, 1998. Whether it can actually be distinguished as a separate species or subspecies,or is another synonym because it includes forms that overlap in all measurable aspects of the morphology of at least one of the forms of the modern species, needs to be determined rigorously with detailed series of measurements and statistical analyses. The few specimens that I have with preserved color patterns are consistent with those of the modern *O. fulgurator*.

***O. sayana* Ravenel, 1834** is also an abundant South Bay species. It has about 3 1/2 small, conical protoconch whorls. The apical callus is generally flared outward and ends just above the level of the edge of the next whorl, so that a slight gap is visible from the side, a very slight notch in the profile of the apex. Note that in *O. edwardsae* the profile is more stepped than notched, as the callus does not overhang the next whorl, but goes down smoothly into the channel. *O. sayana* has wide, generally sharp teeth, and a generally narrower shape than *O. edwardsae*. The flare of the callus away from each apical whorl may give this species a stepped spire. But this is only superficially similar to the stepped spire of *O. edwardsae*.

Mature specimens of this species can be distinguished from submature specimens by the posteriorly lengthened outer lip. An old specimen will show the lip to be so high that it practically covers the previous whorl. The siphonal notch does not change angle, but the angle of the whorl top changes from sloping toward the anterior to sloping toward the posterior.

The 54 mature specimens from South Bay in my collection vary from 31 mm to 45 mm. The respective widths are 13 mm and 19 mm. The spire height varies from 11% to 21% of the total length. The 34 immature specimens vary from 34 mm to 11 mm.

This population can be distinguished from most populations of its Recent descendent (as redescribed in Tursch et al, 1998) by its relatively stocky barrel shape, and by its great variability. The color pattern, where preserved, is consistent with the modern form. Although a small number of specimens appear to overlap in form with modern *O. sayana*, this population is distinct; but it makes little sense to name it at a species or subspecies level unless a careful morphometric study shows that it is a distinct species. Tursch et al, 1998, showed that all the modern subspecies of this species overlap, and are best referred to as local populations, or varieties. As a newly evolved species, *O. sayana* characteristically shows a wide variety of forms. Ultimately only a few of these forms stabilized as distinct populations or subspecies. Modern populations are generally less variable.

O. sayana, although almost as common as *O. edwardsae* at South Bay, is not noted in Petuch's *Atlas* from the Bermont Fauna. Petuch restricts the name *O. sayana* sensu stricto to the late Pleistocene Fort Thompson-to-Recent faunas only. He apparently assumed it to be a new species or subspecies, one of many he never got around to naming.

O. sayana sarasotaensis Petuch and Sargent, 1986, named from 15-meter deep water 15 km off Western Florida, was noted by Petuch (1994) from the Loxahatchee Fauna (Upper Bermont Formation). This subspecies is not a good name for the South Bay form. The modern population has a relatively consistent, smaller, broader, higher spired form. Although a few specimens of the South Bay population fit this form, it does not characterize the population. Tursch et al (1998) reduced this name to a synonym, representing a local variety.

O. sayana generally lives in shallower water than *O. fulgurator* does. There is not sufficient stratigraphic control to say whether this pattern held true in the Bermont Fauna.

***O. murielae* Olsson, 1967**, is a species named from one specimen from the Bermont Fauna at Indiantown, Florida. This is a good example of why species should be named from more than one specimen, as the holotype is apparently a freak. On the holotype the siphonal fasciole band is constricted, distorting the base of the columella. This may have been caused by damage to the mantle early in growth. It also may be the reason why Hoerle did not report it from the Belle Glade pit. Without that distortion it may have been considered to be just a very low spired *O. sayana*. (There appears to be a complete gradient between high and low spired *O. sayana*, although the low spired forms are relatively uncommon. Comparably low spired specimens of *O. edwardsae* in my collection are similarly uncommon.)

Petuch (1994) tried to illustrate *O. murielae* with one photo of an unconstricted specimen, possibly an uncharacteristically inflated specimen of *O. sayana*. (As it comes from a different locality, Dade County, with distinctly different faunal elements, it may represent an ecophenotype, a geographic variant, or a different species.) Petuch (1988) also labeled a typically shaped but very low spired *O. sayana* specimen as *O. murielae*. To further complicate the species, Petuch (1992) also illustrated an apparent low spired *O. edwardsae* as *O. murielae*.

I have not seen evidence of a constricted base in any specimen referable to *O. murielae* other than the holotype, and I believe that the name should be restricted to that holotype. Perhaps further collecting will show a population of distorted specimens that do not blend into another species. As the holotype lacks a protoconch, it may not ultimately be assignable to any other species with certainty. The chart below will add details to compare these species.

***O. lindae* Petuch, 1991**, was named from a submature specimen of 29 mm, collected 22 km south of South Bay, also from the North New River Canal. I have 11 specimens from South Bay ranging in length from 11 to 37 mm. Of the 2 mature specimens (36.6 and 37 mm long, 16 and 15.4 mm wide respectively, both with an apex of 8.3 mm high-about 22.5% of the total length), neither have an expanded lip, although

both have 5 post-protoconch whorls. It is a distinctively tapered species with a wide, 2 1/2 whorled protoconch, a high conical spire, barely visible notches and almost no stepping in the spire profile. The columella is distinctly straight. (The columella of the other species bulges into the aperture of the shell at about the level of the suprafasciolar band.) The posterior teeth are often weak to obsolete in maturity, the remaining teeth are thin to wide, but subdued, nearly flush with the columella. Some of the characteristics in the original species description are typical of most immature specimens of all the species, like narrow teeth and thin shell. This is a problem with *O. cokyae* also.

O. smithorum Petuch, 1994, from the overlying Loxahatchee Fauna (or Upper Bermont Formation), is essentially identical to its probable antecedent *O. lindae*, except that it is larger, at 47 mm. Because Petuch based his understanding of *O. lindae* on a submature specimen, he saw more differences in shape, differences that are really minor. I consider this to be most likely a synonym of *O. lindae*.

O. lindae may also be a synonym of *O. fulgurator*. This form is distinguishable enough from *O. edwardsae* to be consistently separable, with no apparent overlap (although my sample is very small). However, this form may not be distinct enough to have separated from the many forms of the modern Western Atlantic species. *O. antillensis* Petuch and Sargent, 1986, has a shape not unlike *O. lindae*. The details are not important as I am not trying to say that these two forms represent the same narrowly defined species, just that with the very wide range of shapes that have been shown by Tursch *et al* (1989) to constitute the full range of *O. fulgurator*, it is likely that this early form fits within that range. Thus, if a full statistical analysis of this form cannot support separation, *O. lindae* may be considered an incipient species, one that did not succeed in becoming distinctive enough to be considered to be an objective species in its own right, and thus a local variant of *O. fulgurator*.

COMPARISONS OF SOUTH BAY *OLIVA* SPECIES

	edwardsae	*sayana*	*muriele*	*lindae*	*cokyae*	*southbayensis*
Shape	Broad barrel	Broad to narrow barrel	Barrel with anterior contraction	Slender, weak shoulder	Stocky, angled shoulder	Rounded barrel
Mature size	28-48 mm	33-46 mm	47 mm	36-37 mm	30-32 mm	40 mm
Protoconch	Wide, 2 1/3 whorl	Conic, 3 whorl	? Missing from holotype	Wide, 2 whorl	Wide, 2 whorl	Wide, 2 whorl
Spire shape	High to low conical, straight to convex; Strongly to weakly stepped	Conical, straight to convex, rarely low, obtuse	Low, obtuse weakly stepped	High conical straight sided to weakly stepped	High to average conical, straight sided	High concave conical
Notched spire	No	Yes	Yes	Barely visibly yes	yes	?
Tooth shape (central columella)	Paired to flattened, blunt	Thin to wide, sharp	Thin, sharp	Thin to wide, obsolete posteriorly	Thin to wide, bent, often blunt	Wide, straight
Teeth (#)	15-20	15-21	17	10-18	14-18	20-22

***O. cokyae* Petuch 1991,** was also named from a submature (26 mm long) specimen, with the holotype from the Capeletti Brothers pit in Dade County. Petuch (1994) shows another, similar specimen from South Bay. It is variable, but basically barrel shaped, with a rounded to strong shoulder, and usually tapering toward the anterior. It has a wide, approximately 21/2-whorl protoconch, but a notched apex, with little or no stepping. The apex is generally flat-sided, slightly convex conical to high conical, with a callus that is nearly flat, rarely slightly flared like *O. sayana*. The central teeth often have flat, blunted ends, approaching the least flattened *O. edwardsae*.

I have 13 specimens from South Bay, including two mature specimens of 5 post-protoconch whorls: 37 mm long by 17 mm wide with an apex of 21.6% of the length, and 35 mm long by 15.5 mm wide with an apex of 22.8%. More "typical" specimens of about 4 1/2 whorls, are 32 mm long, 14.5 mm wide, with an apex of 20.3%, and 30 mm long, 13.5 mm wide and with an apex 22.3% of the length.

Similar to the other forms with 2 1/2 whorl protoconchs, this form apparently fits very well within the limits of *O. fulgurator*. It looks quite like *O. reticularis* Lamarck, 1811, as was noted by Petuch in his description. *O. reclusa* Marrat has a very similar apex, also with a notch in the profile of the apex. Again, although this form is distinct enough from *O. edwardsae* to be named, it apparently did not separate from the broad range of *O. fulgurator*. I expect a good statistical analysis will reduce *O. cokyae* to a synonym.

***O. southbayensis* Petuch, 1994** is apparently a relatively rare form at South Bay. I have not found a specimen there that I can confidently assign to this species. The locality of the holotype in Petuch's *Atlas* doesn't specify the distance from the town of South Bay but I assume it was close. The holotype is an apparently distinct species, medium sized with a rotund barrel-shaped body, a high, slightly convex apex starting with a wide 2 whorl protoconch, and 20-22 wide straight teeth. However, the only apparently important feature that clearly separates this species from my large *O. cokyae* specimens is the larger number of teeth. *O. cokyae* seems to be consistent at 14 to 18 teeth. Collections from other locations, however, will likely close the gap between these forms.

Note that Tursch et al (1998) barely consider the teeth of the many species that they synonomized. Because the teeth are so variable, even within a fairly consistent local population, they were not considered to be worth measuring, or even counting. Therefore this form also apparently overlaps the limits of *O. fulgurator*, and is comparable to *O. oblonga* Marrat, 1867, among other named forms.

General notes: The species that was probably parent to one or all of the South Bay species is the common Caloosahatchee Fauna species *O. roseae* Petuch, 1991. This is, in turn, the probable descendant of the common Pliocene species *O. carolinensis* Conrad, 1863. *O.roseae* (=*O. reticularis ssp.* of Olsson and Harbison (1953), and *O. carolinensis* of Olsson (1967)), is usually longer and narrower than either *O. edwardsae* or *O. sayana*. It has the wide, flat, 2- whorled protoconch of *O. edwardsae*, combined with the high, notched spire of *O. sayana*. I have forms very similar to this species from other Bermont localities, apparently from deeper water than the dominantly shallow water South Bay locality. Ultimately *O. fulgurator* may be extended back into the Pliocene, with a much wider range of overlapping forms than in the Recent. If so it may be prudent to save at least some of the fossil epithets as subspecies names.

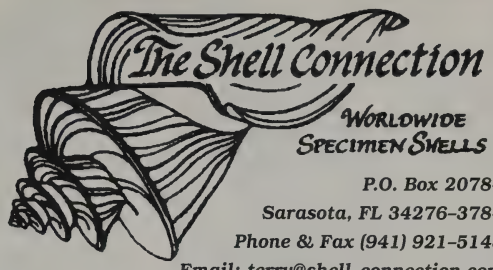
There possibly was interbreeding between *O. sayana* and *O. edwardsae*, because I have a few specimens which seem to be *O. sayana* but have the teeth of *O. edwardsae*. There are also some *O. edwardsae* with the teeth of *O. sayana*. It is possible, but not probable, that *O. southbayensis* and *O. cokyae* are also interbreeds, rather than true species. *O. lindae*, with its distinct, straight columella and often obsolete teeth, appears to be less closely related. However, a careful morphometric analysis of enough of my specimens will probably show that all these forms include specimens which cannot be separated from specimens of *O. fulgurator*, and thus would be best treated as synonyms, possible subspecies.

Conclusion: The modern Caribbean fauna has only three *Oliva* species occurring together: *O. fulgurator*, *O. sayana* and *O. scripta*. The many named forms of these species occur in distinct colonies with little or no geographic overlap. Thus you cannot find as wide a range of forms in a modern Florida area as you can at South Bay. This implies that there was at least the beginning of rapid speciation during the middle Pleistocene Bermont that apparently did not survive into the late Pleistocene. The basal Pleistocene Caloosahatchee Fauna of the Okeechobee Formation largely died with the drop of sea level and water temperature caused by glaciation. The middle Pleistocene Bermont Fauna includes new forms that evolved to take advantage of a new open environment following the return of the sea. Whether or not these forms separated completely into new species in the short time before their extinction is not proven, but quite possible. However we cannot check interbreeding in fossils directly, so we must compare morphologies of these and closely related morphospecies.

Considering fossil populations as equivalent to geographic populations, these distinct forms must also be compared to the very wide total morphologic range of the modern species. If some of the varieties within a fossil population cannot be morphologically separated from modern forms, the population should be considered to represent a time restricted variety or subspecies of the modern species.

Thus using the "distinctive forms" model, there are two common species (*O. sayana* and *O. edwardsae*), two relatively uncommon (*O. cokyae* and *O. lindae*), and possibly one very rare species (*O. southbayensis*) that one can expect to occur in the middle Pleistocene Bermont at South Bay and at many similar areas in Southern Florida. This does not include *O. murielae*, despite Petuch's efforts. However, use of the model of Tursch et al, (1998) probably leaves only two species, *O. sayana* and *O. fulgurator*. The named Bermont forms would be considered to represent incipient species, and only

— Continued on Page 31



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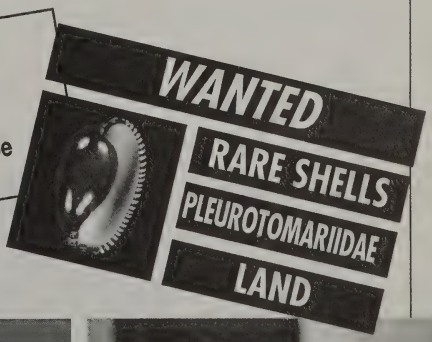

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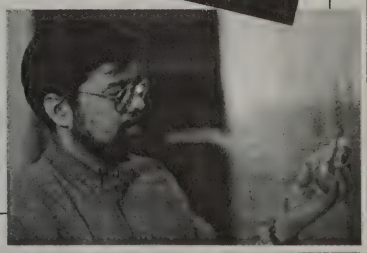


New Jersey *Epitonium*

by Judy-Lynn Goldberg and Robert Robertson

We report here on what we believe to be the longest and most frequent beach sampling records (for mainly empty shells) of any marine gastropod genus. *Epitonium* is not usually considered "common" anywhere, and our data should be of interest to other collectors and paleoecologists, particularly those interested in the fate of empty shells until perchance they are fossilized. We were surprised that as many as six species are beached on the (nontropical) outer New Jersey coast, suggesting that perhaps four of them may have colonies there in shallow water. Of the six, *E. humphreysii* was by far the most common, and it was (with one exception) always the one washed ashore alive. The numbers of individuals are high because great effort went into collecting them. Our sample of this species undoubtedly is the largest ever made of any single species of *Epitonium* at one locality..

The collections and observations were made by the first author mainly at Ocean City, Cape May County, New Jersey, on the beach adjacent to Streets 23 through 34. A few shells included in the totals came from Wildwood Crest and Sea Isle City (nearby in New Jersey). Sampling began intermittently at the beginning of July 1996, but year round collecting (including winters) at fairly regular intervals did not begin until about March 1999. This is continuing after March 18, 2001. By then, 1,838 specimens had been collected. The maximum in any one year (2000) was 715. This may have been due to more intensive collecting, or greater abundance, or more probably both of these. Sampling was done diligently almost every other weekend, tides permitting. Weather rarely hindered a visit. Collecting had to begin during an outgoing tide until low tide. Storms appear to decrease rather than increase the number of specimens washed ashore, probably because they scour the beach.

It can be obvious if a beach shell is freshly "dead." But if it is worn or broken, or has darkened, it can have died hundreds to many thousands of years earlier. We believe that the numerous blackened gastropod and bivalve shells on the New Jersey beaches are Pleistocene fossils that have been eroded out of buried fossil beds. Our *Epitonium* shells range from white to dark grey, but the living animals always have white shells. Although the grey shells were collected with living ones loose on the beach, they too could be Pleistocene fossils. We did not see *E. rupicola* alive, but their fresh, empty shells range in color naturally from whitish to brown or reddish brown (often spirally banded).

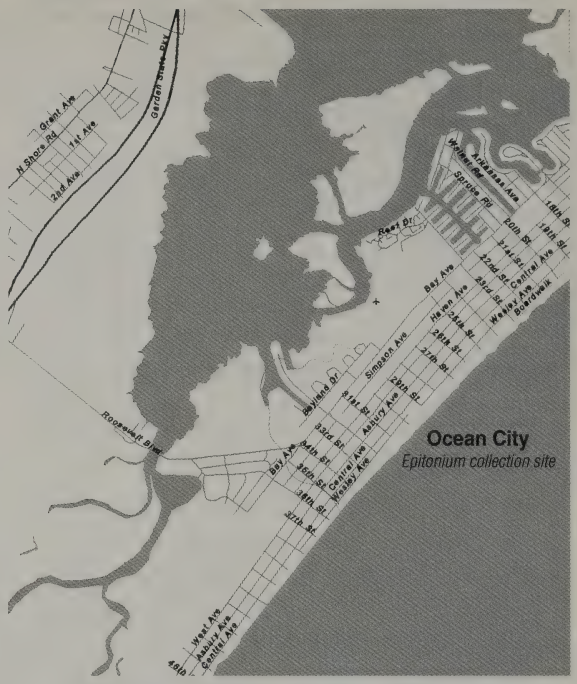
The six co-occurring New Jersey species of *Epitonium* that we have found are in decreasing abundance:

Number of specimens:

E. humphreysii (Kiener, 1838) (88 % of all the shells)	1,625 (16 % live)
E. rupicola (Kurtz, 1860) [not = *rupicolum*]	119
E. multistriatum (Say, 1826)	73
E. candeanum (d'Orbigny, 1842 ?)	16
E.angulatum (Say, 1830)	3
E. tollini Bartsch, 1938	1

We follow Clench & Turner's (1951, 1952) monographs, but believe that the systematics of western Atlantic *Epitonium* needs further study.

Some specimens occurred with opercula, but these were not lodged in empty shell apertures as can happen in other gastropods. These epitoniums were either still alive or contained freshly dead animals. Some living ones released dark purple dye from their pigmented mantle glands (Robertson, near submission). There was only one "live" *E. multistriatum*. All the others were live *E. humphreysii*—248 of them. Living animals are far the most abundant in the late winter and early spring months, February through April. With different years combined, in January there were 3 living; in February, 81; in March, 126 (including a record 108 in one day when there was a new moon); and in April, 18. There were a few other, isolated living occurrences in other months: at the end of August, 9; in October, 1; and in December, 10. Perhaps this species comes in near shore to breed each February and March ? Is there lunar periodicity ? The smallest and largest *E. humphreysii* shells are 2.0 mm and 22.5 mm long (a pending world record). Clench & Turner (1951) gave the maximum length as 18.2 mm, and reported that normally there are 8 or 9 "costae" (ribs) on the last whorl. One of ours has eleven. On rib count variation in *Epitonium* see Robertson (1983c).



No live *E.rupicola* were found on the outer beach. The second author has collected and studied living animals of this species from the eastern shore of southern Delaware Bay (Robertson, 1963), where the water may, perhaps temporarily, be slightly brackish. Unlike most if not all other wentletraps, *E. rupicola* is tolerant of (or needs ?) brackish water. Merrill & Boss (1966) reported 16 specimens from the lower Patuxent River, Maryland (Chesapeake Bay) where the bottom is remarkably deep for the Bay (130 ft), and the bottom salinity once was only 12.23 parts per thousand (normal seawater is about 35). Presumably the animals were living. Judging by the shell (his fig. 1), McDermott (1981) may have studied another species, reporting *E. "rupicola"* in a salinity down to 17.8 in Delaware Bay, New Jersey, and about 19 in the lower Chesapeake, Virginia. It survived well in a lab salinity of 25, but it remains unknown whether this species can survive or live in fully marine water. The empty shells of *E. rupicola* found on the outer beach of New Jersey may have been carried there by water currents from the bay inside the barrier island, but we have not collected there.

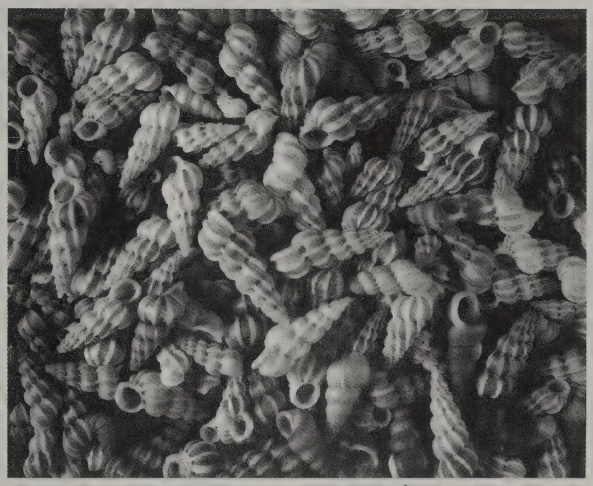
The shells were very rare high on the beach, and we do not know where these came from. Most specimens were hand-picked from the drift lines (grunge) left on the beach by the receding waves. Specimens were also dip-netted in the coarse, mixed sediment from the submerged slope descending outwards under the breaking waves. On some occasions, and in some places, there is a shallow sand bar nearly parallel to and near the shore, making a trough between that perhaps retains some of the shells. The empty shells seem to be somewhat wave sorted. Those of *E. humphreysii* seem to occur most often in drift lines (grunge), where the waves have receded, while *E. rupicola* is more often lower down near where the waves break at low water. Perhaps this is due to *E. humphreysii* shells having prominent, thicker axial ribs, and *E. rupicola* having ribs that are reduced or (nearly ?) absent. For some unknown reason, the empty wentletraps often co-occur with empty *Nassarius trivittatus* shells, and are only rarely found without them.

So far as is known, all epitoniids feed on the soft tissues of coelenterates such as sea anemones and corals. On the beach, there were no indications that any sea anemones live offshore that might be fed upon by the epitoniums. Offshore, the bottom is naturally sandy. There are, though, man-made rock jetties, and wrecks and artificial reefs. Sea anemones could live attached to these. However, the sea anemone *Paranthus rapiformis* lives partially buried in sand in Delaware Bay and when offered was fed upon by *E. rupicola* (Robertson, 1963). We do not know whether *Paranthus* lives off the eastern coast. We did no diving or dredging there. *E. rupicola* was stated by Boss &

Merrill (1965) to be a predator on the sea anemone *Aiptasia eruptaurantia* in the Chesapeake. They did not elaborate, and we are unfamiliar with this anemone. Under experimental conditions, New Jersey *E. rupicola* was seen by Robertson (1963) to feed also on another anemone: *Haliplanella luciae*. Some species of *Epitonium* are not naturally host or prey specific.

Single ptenoglossate radular teeth of *E. angulatum*, *E. humphreysii*, and *E. tollini* were illustrated with line drawings by Clench & Turner (1952, pl. 176), who indicated that the third species has a single terminal cusp, while the first two each have two cusps separated by two embayments. Not surprisingly, according to them there are greater generic radular differences in the Epitoniidae than there are species characters.

Robertson (1994) is a popular general article on *Epitonium* egg capsules and veligers. Very little specific is yet known about the six species on the New Jersey coast, and nothing at all about four of them. Threads with attached but dried egg capsules (not "cases") of *E. humphreysii* from western Florida, were illustrated by Clench & Turner (1951, pl. 120, fig. 1) and discussed and also illustrated by Perry & Schwengel (1955: 114, pl. 46, fig. 320).



McDermott (1981) is an excellent study of the reproduction of *E. "rupicola"* both at the southeastern coast of Delaware Bay, New Jersey, and in Virginia. Specifically, he studied the elastic egg strings and capsules and the numbers of eggs each contained, and the eggs and their development into veliger larvae. These hatched but did not metamorphose in the lab.

The mean shell length of the hatching veligers was 0.156 mm. These larvae are so tiny that they must be planktotrophic, i.e. they swim while feeding on minuscule plant plankton for some weeks. It would have been helpful if egg size had been measured. No *Epitonium* is so far known to hatch crawling from its egg capsules. The eggs would be unusually large, and the species might have a restricted geographical range.

The two southern species appear to be extensions of known range. *E. tollini* was known only from western Florida by Clench & Turner (1951: 266-268, pl. 118). *E. candeanum* was known to range no farther north than northeastern Florida and Bermuda (same, 1952: 301-305, pls. 140-142). The four other species are also known well south of New Jersey (to Florida, and definitely three of them to Texas), but also occur at Long Island, New York (one species) or Massachusetts (the other three).

The dominance of *E. humphreysii* suggests that there is a breeding population nearby, but we saw no *Epitonium* egg capsules. The two rare southern species (*E. candeanum* and *E. tollini*) could have come north as planktonic larvae in the ocean currents near the coast. Even in summer they may not have New Jersey breeding populations (like coquina clams, *Donax* ?).

A good introduction to the Epitoniidae is by Neville (2001). The too few papers on *Epitonium* life histories are: Robertson (1983b), and Collin (2000). Papers on hosts and feeding, sex change, fast growth and egg capsules and veligers are: Robertson (1963, 1981, 1983a, 1994). Gittenberger and others (2000) is a good entry to the post-1963 publications on hosts and feeding.

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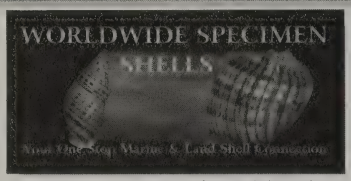

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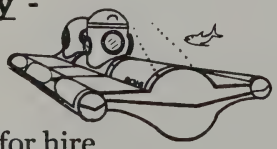

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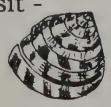

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Expanding the COA Grant Program

by Gary Rosenberg

As chairman of the grants committee for COA, I was pleased to receive a proposal earlier this year from Donald Dan to expand COA's program for awarding grants. At the midyear meeting of the COA board of directors in March, this proposal was discussed, and the board adopted a resolution that will allow COA to administer grants for organizations and individuals interested in furthering research in conchology and malacology. This will allow shell clubs, for example, to award grants through COA, instead of having to set up their own administrative structures.

A similar idea has already been pioneered by the Western Society of Malacologists, which administers grants funded by the Santa Barbara Malacological Society, the Southwestern Malacological Society, the San Diego Shell Club, and the Northern California Malacozoological Club. COA already has a structure in place for administering grants: the committee I chair solicits and reviews applications, and has standard procedures for notifying applicants of committee decisions, which are approved by the COA board. Funding of the awards is handled by COA's treasurer.

A named grant can be awarded with a gift of $1000 or more. Some shell clubs might in this way fund annual grants in their name from their operating budget. Gifts to COA of less than $1000 intended for grants will be directed to the Walter Sage Fund, which currently is the only named grant administered by COA. An organization or individual wishing to establish a fund to award a named grant in perpetuity must contribute a sum of at least $10,000 over 10 years, with an initial gift of at least $1000. Thus establishment of a memorial grant similar to the Sage Grant requires an endowed fund with a minimum of $10,000. COA will use half of the income from endowed funds to award grants, and reinvest half in the named fund to ensure that it continues to grow. If someone sets out to create an endowed fund, but does not reached the $10,000 level within 10 years, the funds will revert to the Sage Fund. COA's by-laws have rules for the investment of the funds controlled by the organization.

An endowment of $10,000 is not sufficient to award a grant annually. As a conservative assumption, consider that a $10,000 fund earns 5% interest. The annual income will be $500, half of which can go to a grant, and half of which is reinvested in the fund. A $10,000 endowment would therefore fund a $500 to $1000 grant every two to four years.

COA will try to match grants to the stated interests of donors, but cannot guarantee that matches will be exact. A shell club may prefer that grants be given to a graduate student at a local university, or an individual might prefer grants directed toward study of a particular group of mollusks, but if matches are not found, a grant may be awarded to another deserving proposal that is consistent with COA's goals. All grants will be awarded under guidelines recommended by the grant committee and approved by the board of directors. The current guidelines for grants may be viewed on COA's website *<http://coa.acnatsci.org/conchnet/coagrant.html>*. Under current guidelines, grants are restricted to citizens or permanent residents of any country in North, South, or Central America or the Caribbean, or to students attending graduate school in the United States.

In practice, most grants go to graduate students, but they may also be made to conchologists, shell clubs, or professional malacologists, as long as the proposals pass muster with the grant committee. COA will also continue to fund grants in the normal way, using funds from the operating budget. Currently about $10,000 per year is budgeted for grants, and another $400 to $500 per year is generated by the Sage Fund. A summary of the proposals received and funded in 2001 is given below; my next column will summarize some of the research results of previous grantees.

Grant Report for 2001

The Grants Committee in 2001 consisted of Dr. Henry Chaney, Dr. G. Thomas Watters and myself. In 2001, we received 28 grant proposals requesting a total of $35,070 in support, a slight increase from 2000, with 25 proposals totaling $28,236. All of the applicants were graduate students. Three of the proposals were international, all from Argentina.

Each committee member ranks proposals from A1 (best) to A3 (worst). This year, nine proposals received scores averaging better than A2. These nine requested a total of $10,729, slightly more than the $10,400 available for grants in this year's budget. With a few judicious cuts, we were able to recommend adequate funding for all nine. We selected the proposal by Audrey Aronowsky on naticid egg collars for the Walter Sage Award, because of its overall excellence and the likelihood that its subject would have been of interest to Walter himself. The following awards were made, listed alphabetically by recipient; amounts awarded are based on budgets presented in the proposals and do not reflect relative merit of the proposals.

Audrey Aronowsky (University of California, Berkeley, $1,000, "Why do naticids use sand in the construction of egg collars?") will study sand grain selection by naticids and thereby test several hypotheses about the function of the egg collars, including camouflage, mechanical anti-predator deterrence, and anchoring.

Christopher Block and Edward Sobek (Texas Tech University, $1,300, "Evaluation of *Caracolus caracolla* as a potential ecosystem engineer in the Tabonuco Forest of Puerto Rico") theorize that snail feces increases the activity of bacteria in decomposing leaf litter, thereby increasing plant growth, and plan to test this idea by studying nutrient levels and microbial activity in feces treated with antibiotics versus untreated.

Kenneth A. Hayes (University of South Florida, $1,500, "Evolution of the 'Corona Complex' in the genus *Melongena* [Gastropoda: Melongenidae]: Internal transcribed spacer regions and microsatellite DNA") notes that traditional studies based on morphology have failed to resolve the status of the species, subspecies and varieties of *Melongena* and will use studies of DNA sequences as an alternate approach.

Jonathan R. Hendricks (Cornell University, New York, $900, "Systematic revision of the Pinecrest *Conus* complex") notes the high apparent diversity of fossil *Conus* species in the Pinecrest beds of Florida, and will use statistical methods to study the range of variation in the species, to determine if that diversity is real, or an artifact of taxonomy.

James W. Kurpius (University of California, Berkeley, $1,400, "Panmixia or genetic differentiation?: Phylogeographic patterns of a planktonic dispersing gastropod in the Eastern Pacific") takes a *Littorina* species with larvae that spend a long time in the plankton, and asks if that dispersal ability allows widespread interbreeding (panmixia), or if geographic barriers such as strong differences in temperature in currents prevent interbreeding, resulting in genetic breaks between populations.

John C. Malone (University of California, Los Angeles, $800, "Consumer-resource interactions of two marine gastropod grazers") uses two *Tegula* species in California that feed in different ways on the same algae, one grazing intensively in restricted areas, the other munching here and there, to study how species can coexist despite competing with one another.

Jennifer M. Walker (University of Alabama, $1,500, "Phylogenetic analysis and resource recognition in populations of *Melongena corona* (Gmelin) from the Alabama and Florida Gulf Coast") has found that *Melongena* from comparable but geographically distant habitats are more similar to each other than to ones from different but nearby habitats, and plans to use DNA sequences to see if relatedness correlates with geography or habitat.

Amy R. Wethington (University of Alabama, $1,000, "Phylogeny, taxonomy, and evolution of reproductive isolation in *Physa* [Pulmonata: Physidae]") explains that physid snails are difficult to identify , but easy to raise in the laboratory (physids are the common left-handed aquarium snails) and will do breeding experiments to help define boundaries between species.

Diego G. Zelaya (Facultad de Ciencias Naturales y Museo, La Plata, Argentina, $1,000, "Systematics and biogeography of southwestern Atlantic Margaritini [Gastropoda: Trochidae]") notes that little work has been done on this group of trochids in the Magellanic region and South Georgia Island and will undertake a revision of their taxonomy.

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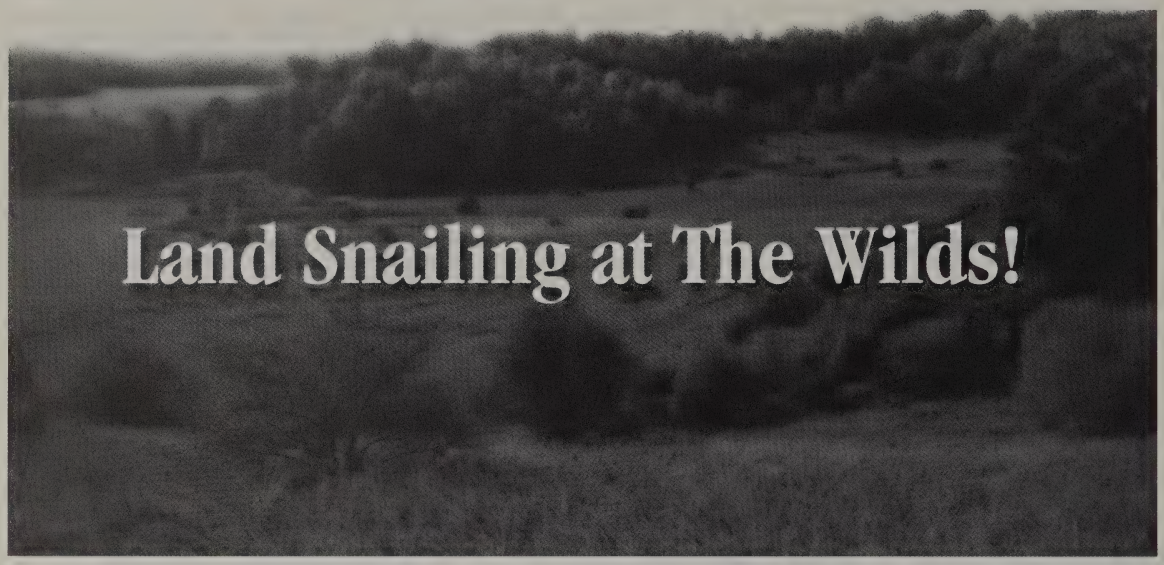
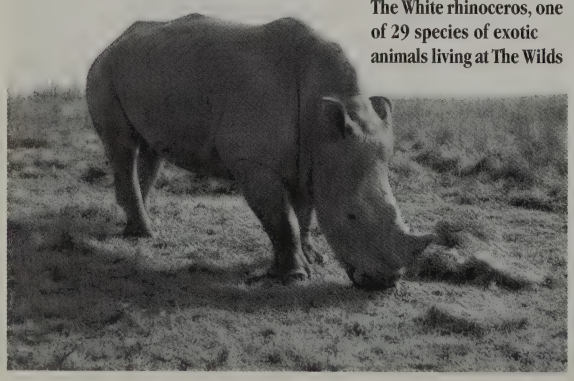


Land Snailing at The Wilds!

by G. Thomas Watters

As I turn the corner on a rutted dirt road, I have to stop for several Reticulated Giraffe sauntering across my path. They are not happy to see me. Further on I exit my Snail-mobile and enter the woods to collect. I hear a rustling in the bushes and a loud hissing and I quickly exit the woods, with a very irate Trumpeter Swan madly flapping its wings in hot pursuit. Later my SUV is challenged by a snorting, overly-macho Pzrewalski's horse wishing to make his point that this is *his* pasture. White Rhinoceros graze placidly as I collect microscopic snails from their watering hole. Pronghorns amble over to see what I am doing. Finally, after a long day, I drive the 100 miles back to base camp—my suburban home in Columbus, Ohio, USA.

I am perhaps the only person in Ohio to have collected snails among rhinos *in Ohio*. How is this possible? It is because of a marvelous place called The Wilds—a 10,000+ acre free-range zoo in Muskingum County, Ohio. It is the largest contiguous piece of reclaimed strip-mined land in the United States. It was once the home of the largest drag-line back-hoe in the world; the bucket alone could hold 10 school buses. Now the land holds some 29 species of exotic animals from around the world, most in active captive breeding programs. Some of the animals no longer occur in the *real* wilds, such as the Pzrewalski's horse, which was the sturdy (but bad-tempered) species of horse that the sturdy (but bad-tempered) Mongols rode upon to conquer most of Eurasia (and the horse so prominently featured in European cave paintings). Rather than living in cages in the more typical zoos, animals at The Wilds live on hundreds or thousands of acres, separated from each other and visitors by high electric fences decidedly reminiscent of *Jurassic Park*.



The White rhinoceros, one of 29 species of exotic animals living at The Wilds

So what does that have to do with yours truly and snails? Well most of The Wilds has not been turned over to exotics yet and exists only as the Great Outdoors. I can leave my car to hike to my collecting sites and never hear a car horn, a boom box, Brittney Spears, or any of the other human folderol — just birds and bugs. But because this extensive area is private property it has become a haven for some of Ohio's most exploited wildlife—white tail deer. And therein lies the problem. There are *a lot* of deer. And with them are their parasites, including a parasitic nematode worm called *Parelaphostrongylus*. Adult worms live in deer and eggs exit in the deer feces. The eggs hatch into microscopic larvae and burrow into terrestrial snails. The life cycle is completed when deer incidentally eat the snails along with vegetation. Problems arise when the exotic animals at The Wilds eat these snails, for although the worm is a "good" parasite in its normal definitive host, the deer, it is a decidedly "bad" parasite in the exotics. There it is debilitating and even fatal.

My job is to map the distributions of snails at The Wilds using GIS technology (Geographic Information Systems). Basically that entails using a hand-held GPS unit (Global Positioning System) that relies on orbiting satellites to tell you where you are—a necessity when collecting in 10,000 acres of fields and woods. In addition a colleague at the Ohio State University Veterinary School is determining which snail species act as the vectors for the worm. In the end we hope to give to The Wilds maps showing where the vector snails live so that zoo personnel can make informed management decisions concerning where to locate exotic livestock.

Collection is often difficult. The terrain is pock-marked by quarries. Paths, except for meandering deer-paths, are virtually nonexistant. The vegetation is not exactly a hiker's dream, consisting largely of hawthorns, honey locust, greenbrier, multiflora rose, and nettles. To date I have sampled 220 sites over 4,600 acres. Each sample consists of a 0.25m^2 quadrant of leaf litter and soil. These are air-dried back at the laboratory and snails are picked out under a dissecting scope. Nearly 50 species have been found so far (see listing on next page), including four species new to the state and many county records—almost half of all the land snail species recorded from Ohio. Most are very small—less than 5 mm, and many less than 2 mm. Surprisingly, of the 50 or so species only one exotic has been found. That was *Arion subfuscus*, a slug. It was found only at the picnic area of the Visitor's Center, an obvious introduction by some unsuspecting patron or by the construction machinery

used to make the Center.

Two of the new state records are for more northerly species: *Discus catskillensis* and *Vitrina angelicae*. The first species once had a much wider range across eastern North America during the last period of glaciation, but as the glacier retreated so did the snail. What we apparently have at The Wilds are a few isolated populations that were left behind as the species moved north. None of these populations cover more than an a few acres and occur in deep woods on moist rotting logs. The second species, *Vitrina limpida*, is a most unusual species. It is a "shelled slug," that is, it possesses a shell but the shell is too small to offer much protection. Surprisingly, the slug is a winter species, often found crawling over the snow. During the summer the snail exists only as eggs and juveniles. Unlike other snails, it does not "overwinter" but rather "oversummers." Although its normal range is to the north of Ohio, it has survived here by picking out places in The Wilds that tend to be the coldest—the north-facing slopes of higher elevation hills. A third state record is the slug *Pallifera fosteri*, immediately recognizable by its black polka-dots on a white background. This southern species was found in a single place, a verdant moss-covered ravine with seeps and waterfalls.

This snail survey has several potentially interesting goals. In addition to mapping the snail vectors for a deadly parasite, we may ask some broader ecological and conservation questions. How does the snail fauna of reclaimed mine land compare with the fauna of unmined land? To this end I hope to receive funding for a sister study of a truly "wild" portion of nearby Ohio at the Shawnee State Forest. Results may give important answers about the capacity of reclaimed land to support animal life: Can such lands be recolonized? How fast does it happen? Do "original" species return? Even within The Wilds are very different habitats: fields, woods, wetlands, and ponds. Do the snail faunas differ between field and woods? Between coniferous and deciduous woods? Between exotic vegetation planted as part of the reclamation, such as Autumn Olive, and more native plants? It's a 10,000 acre laboratory just waiting to be used.

If the Pzrewalski's horses will let me.

For additional information, go to *www.thewilds.org* or call 740-638-5030.

The American bison or"buffalo" roam freely. Photos by G. Thomas Watters

Two common snails only found in the deeper woods. Left: *Neohelix albolabris* (Say, 1816). Right: *Anguispira alternata* (Say, 1817).

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Arionidae
- Dusky Arion, *Arion subfuscus* (Draparnaud, 1805)

Carychiidae
- Ice Thorn, *Carychium exile* Lea, 1842

Cochlicopidae
- Glossy Pillar, *Cochlicopa lubrica* (Müller, 1774)

Discidae
- Flamed Disc, *Anguispira alternata* (Say, 1816)
- Angular Disc, *Discus catskillensis* (Pilsbry, 1896)
- Domed Disc, *Discus patulus* (Deshayes, 1830)

Haplotrematidae
- Gray-foot Lancetooth, *Haplotrema concavum* (Say, 1821)

Helicarionidae
- Brown Hive, *Euconulus fulvus* (Müller, 1774)
- *Guppya sterkii* (Dall, 1888)

Helicodiscidae
- Compound Coil, *Helicodiscus parallelus* (Say, 1817)

Limacidae
- Meadow Slug, *Deroceras laeve* (Müller, 1774)

Philomycidae
- Carolina Mantleslug, *Philomycus carolinianus* (Bosc, 1802)
- Pale Mantleslug, *Pallifera dorsalis* (Binney, 1842)
- Foster Mantleslug, *Pallifera fosteri* Baker, 1939

Polygyridae
- Upland Pillsnail, *Euchemotrema fraternum* (Say, 1834)
- White-lip Globe, *Mesodon thyroides* (Say, 1816)
- Toothed Globe, *Mesodon zaletus* (Binney, 1837)
- Whitelip, *Neohelix albolabris* (Say,1816)
- Hairy Slitmouth, *Stenotrema hirsutum* (Say, 1817)
- Northern Threetooth, *Triodopsis tridentata* (Say, 1816)

Punctidae
- Small Spot, *Punctum minutissimum* (Lea, 1841)

Pupillidae
- Armed Snaggletooth, *Gastrocopta armifera* (Say, 1821)
- Bottleneck Snaggletooth, *Gastrocopta contracta* (Say, 1822)
- Comb Snaggletooth, *Gastrocopta pentodon* (Say, 1821)
- Widespread Column, *Pupilla muscorum* (Linnaeus, 1758)
- White-lip Dagger, *Pupoides albilabris* (Adams, 1841)
- Variable Vertigo, *Vertigo gouldi* (Binney, 1843)
- Blade Vertigo, *Vertigo milium* (Gould, 1840)
- Crested Vertigo, *Vertigo pygmaea* (Draparnaud, 1801)
- Honey Vertigo, *Vertigo tridentata* Wolf, 1870
- Five-tooth Vertigo, *Vertigo ventricosa* (Morse, 1865)

Strobilopsidae
- Bronze Pinecone, *Strobilops aeneus* Pilsbry, 1926

Succineidae
- Suboval Ambersnail, *Catinella avara* (Say, 1834)
- Oval Ambersnail, *Succinea ovalis* Say, 1817

Valloniidae
- Costata Vallonia, *Vallonia costata* (Müller, 1774)
- Iriquois Vallonia, *Vallonia excentrica* Sterki, 1893

Vitrinidae
- Eastern Glass-snail, *Vitrina angelicae* Beck, 1837

Zonitidae
- Carved Glyph, *Glyphyalinia indentata* (Say, 1823)
- Sculpted Glyph, *Glyphyalinia rhoadsi* (Pilsbry, 1899)
- Minute Gem, *Hawaiia miniuscula* (Binney, 1840)
- Plain Button, *Mesomphix inornatus* (Say, 1821)
- Amber Glass, *Nesovitrea electrina* (Gould, 1841)
- Fine-ribbed Striate, *Striatura milium* (Morse, 1859)
- Pyramid Dome, *Ventridens intertextus* (Binney, 1841)
- Perforate Dome, *Ventridens demissa* (Binney, 1843)
- Globose Dome, *Ventridens ligera* (Say, 1821)
- Quick Gloss, *Zonitoides arboreus* (Say, 1816)
- Black Gloss, *Zonitoides nitidus* (Müller, 1774)
- Gray-foot Lancetooth, *Haplotrema concavum* (Say, 1821)

I'm Dreaming of a White . . .

THE OLD SHELL GAME

by Paul Monfils

In general, we expect to see increasing levels of anatomical and physiological complexity as we move from "lower" to "higher" taxonomic levels within the animal kingdom—but that is not always the case. One characteristic for which the opposite tends to be the norm is external pigmentation. Mammals, which traditionally occupy the top rung of the taxonomic ladder, are typically rather drab beasts, few of them exhibiting the bold colors and striking patterns so commonly seen in birds, reptiles, and fish; and even these forms, while gaudy by vertebrate standards, would be hard-pressed to compete with many of the invertebrate groups, if it came to a spectral showdown. Such striking visual displays result not only from differences in pigment intensity and arrangement, but also from increased diversity in the nature of the pigments themselves. In mammals, coloration is primarily a function of a single group of brown to black compounds called melanins. Various concentrations and combinations of these substances can produce innumerable shades of yellowish, tan, brown, and gray. A heavy melanin concentration results in a black animal, an absence of melanin in a white animal—pretty straightforward.

Because melanins are chemically similar as a group, their synthesis follows similar pathways. A specific enzyme is involved in melanin production, and a single gene controls formation of the enzyme. Occasionally, an aberration in the gene prevents production of the enzyme. The result—an individual animal incapable of synthesizing melanin, a condition referred to as amelanism. When melanins are the only pigments in the picture, amelanism results in a total lack of pigmentation, a condition referred to as albinism—from the Latin "albus" meaning white. An individual so affected, whether mammal, bird, insect, or mollusk, is termed "an albino." The associated adjective is "albinistic." Conchologists tend to use the noun "albino" as an adjective; and some employ "albinistic" to denote a light-colored specimen which is not really white, a "near-albino" if you will. Both uses are technically faulty. It is correct to say, "this cowrie is an albino"—or —"this is an albinistic cowrie"; but not "this is an albino cowrie." However, common usage often prevails, and I doubt that the halls of conchology will come crashing down if we allow ourselves an occasional grammatical gaffe in the name of popular parlance.

Albinism is well understood in mammals, partially because scientific research tends to favor conditions which directly impact our own species, and partially because mammalian albinism is a relatively simple story. It becomes more complex as we proceed down the taxonomic tree. Consider a simple two-pigment model. My local green frog (*Rana clamitans*) owes its color to a combination of two skin pigments, one blue, the other yellow. Rarely, an individual lacks the yellow pigment, resulting in a blue frog. Now, we would not generally refer to a blue frog as an albino; yet, the underlying condition is identical to that of an albinistic mammal—a congenital inability to synthesize a single pigment. However, because of the double pigmentation, production of an albinistic frog would be a considerably more complex matter than production of an albinistic cat, since it would require simultaneous abnormalities in at least two distinct genes. A genetically induced lack of pigmentation that does not result in total albinism is usually designated by the more general term "hypopigmentation." In a butterfly or crustacean or mollusk whose color pattern involves four or five different pigments, produced by diverse chemical processes controlled by several separate genes, the probability of a true albino is very low indeed.

We know that at least four distinct categories of pigments occur in molluscan shells and soft parts: porphyrins (usually greenish), indigoids (reds and blues), carotenoids (primarily yellows) and melanins (brown to black). In each pigment group, several different compounds exist, so a virtually endless variety of combinations is theoretically possible. However, in actuality the shell markings of most molluscan species are composed of only a small number of pigments. I suspect that species (and families) in which albinism is a relatively common phenomenon are those in which pigmentation is simple, probably restricted to compounds of one pigment category. However, the dearth of published research on such questions makes hard facts difficult to come by.

Even though albinos have full reproductive capability, they are usually rare in nature. This is partially due to the fact that albinism is a recessive trait, which must be

— *Continued on Page 30*

A normal *Vasum cassiforme* is on the left. Does this mean that the white specimen is an albino? *Photo by Jim Miller*

Drymaeus dominicus **(Reeve, 1850) by Mark W. Johnson** *<markwilliamsjohnson@hotmail.com>*
Nikon body w/60mm macro Nikkor, outdoors in daylight w/fill flash, 1/60 sec. f/22, Fuji 100ASA film

2001 SUMMER AND FALL SHELL SHOWS AND MEETINGS

by Donald Dan, COA Awards Director

Jun. 26- Jul. 1 **Oregon Shell Show,** Portland, Oregon
Oregon Museum of Science & Industry, Portland
Maxine Hale, 347 N.E. 136 Ave., Portland, OR 97230-3308
(503) 253-5379

Jul. 7-11 **Conchologists of America Annual Convention**,
Port Canaveral, Florida, Raddison Resort at the Port
Bobbi Cordy, 385 Needle Blvd., Merritt Island, FL 32953
(321) 452-5736 E-mail: *cordy@yourlink.net*

Jul. 14-15 **Jacksonville Shell Show,** Jacksonville Beach, FL
Brampton Inn, 1201 N. First Street, Jacksonville Beach
Carol Rishel, 2115 Beach Ave., Atlantic Beach, FL 32233
(904) 247-7876 E-mail: *rrishel@earthlink.net*

Jul. 21-23 **Keppel Bay Shell Show,** Yeppoon, Queensland, Australia
Jean M. Offord, 277 McDougall St.
N. Rockhampton, Qld. 4701, Australia (79) 283-509

Jul. 28-29 **Townsville Shell Show**, Townsville, Queensland, Australia
Cutharinga Bowls Club on Harold Street, West End
Glenda Rowse, 19 Farrell Street Kirwan 4814, Queensland, Australia
(7) 47 73 28 17

Aug. 17-18 **Jersey Cape Shell Show**, Stone Harbor, New Jersey
Wetlands Institute, Stone Harbor Jersey Cape Shell Club
P.O. Box 124, Stone Harbor, NJ 08247 (609) 653-8017

Aug. 19-25 **American Malacological Society / Unitas Joint Meeting**
University of Vienna Dr. Janice Voltzow, Department of Biology
University of Scranton, Scranton, PA 18510-4625
(570) 941-4378 E-mail: *voltzowj2@scranton.edu*

Sept. 14-16 **North Carolina Shell Show,** Pine Knoll Shores, NC
North Carolina Aquarium at Pine Knoll Shores
Ann Buddenhagen, 804 Westwood Drive Raleigh, NC 27607
(919) 787-7103 E-mail: *pabjetster@aol.com*

Sept. 15-16 **Int. Shells and Fossils Bourse,** Ottmarsheim, France
Salle Polyvalente, Rue de la Priscine
Michel Rioual, 2 Rue des Vergers, 68490 Ottmarsheim, France
(3) 89-26-16-43

Sept. 28-30 **Annual German Shell Fair**, Öhringen
KULTURA, Öhringen Kurt Kreipl, Meeresmuseum, Höhenweg 6
D-74613 Öhringen-Cappel, Germany 49 (7941) 62826
E-mail: meeresmuseum@t-online.de Fax: 49 (7941) 2065

Oct. 19-21 **Sea Shell Searchers Shell Show,** Lake Jackson, Texas
The Lake Jackson Civic Center
Wanda Coker 332 Banyan Lake Jackson, Texas 77566
(979)297-0852 E-mail: *sdcoker@brazosport.cc.tx.us*

Oct. 27 **British Shell Collectors' Club Shell Show**, London, England
Napier Hall, Hide Place & Vincent Street
Kevin Brown, 12 Grainger Road
Isleworth, Middlesex TW7 6PQ, England (181) 568-8333

Nov. 3 - 4 **Philadelphia Shell Show,** Philadelphia, PA
Academy of Natural Sciences, Parkway & 19th St.
Al Schilling, 419 Linden Ave., Glenside, PA 19038
(215) 886-5807 E-mail: *alsch@bellatlantic.net*

6704 Overlook Drive, Ft. Myers, FL 33919, U.S.A.
Tel. (941) 481-6704 E-mail: *donaldan@aol.com*

COA TROPHY WINNERS

Edited by Charlotte Lloyd

Photo by Bob Lipe

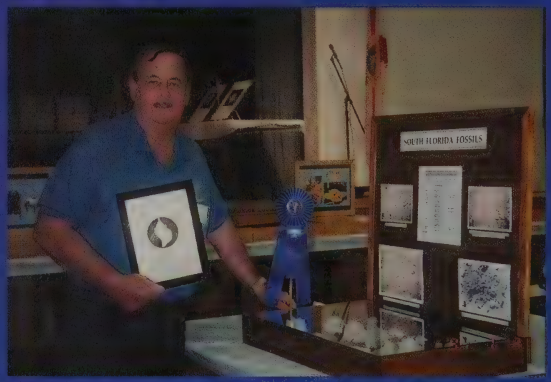
At the St. Petersburg Shell Show this February 23-25, **Jake and Sylvia Dominey** won their trophy with their exhibit entitled "Pectinidae." This 47-foot display had educational material, photographs, scientific drawings, history and art, information on pectens as a source of food, and wonderful shells! This display has won all the major awards at the winter shows. Great job by Sylvia and Jake!

Linda Zylman took the coveted award at the Space Coast Shell Fiesta (The Astronaut Trail Shells Club) in January of this year. Over 2,700 visitors viewed Linda's 20 foot exhibit, "Shells of the Vara'u Group, Tonga." These shells were self-collected on a trip to Tonga in February of 2000. Another great exhibit by this exceptional collector.

COA member **Jim VunKannon** won the COA Award at the Naples Shell Show February 15-18 of this year with his 24 foot exhibit, "Shelling Caicos and Bahama Out Islands," which held beautiful shells and backboards. Jim is shown receiving the COA from **Gary Schmeltz**, President of the Naples Club.

On March 8-10 of this year, **Bud Rogers** won the COA Award at the Marco Island Shell Show. His exhibit, which was titled "*Fusinus* of Tropical Western Atlantic," had it all — excellent specimens, descriptions, pictures and text. Our congratulations to Bud.

Dick Plester's exhibit of Worldwide *Haliotis* was the COA Award winner at the British Collector's Club Annual Shell Show last October 28th. The exhibit caught the eye of the judges and visitors alike. Good job, Dick!

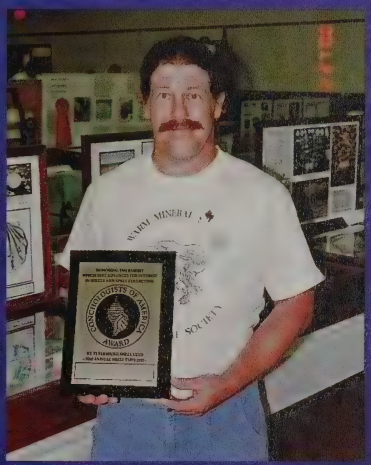


Jim VunKannon again won with his "South Florida Fossils" exhibit at the Broward Shell Show on February 2-4, 2001. This wonderful 30-foot display showed the history and evolution of shells in the South Florida area. Way to go, Jim!

November 4 and 5, 2000 **John and Darlene Schrecke** won their COA at the Philadelphia Shell Show with their exhibit, "The Chank Shells: Genus *Turbinella*". This double case exhibit showed all species of *Turbinella*. Our congratulations to John and Darlene.

B. J. and Lowell Bingham put together an educational exhibit on "Opercula" for the Sanibel Shell Show and were awarded the COA on March 4, 2001. Their 8-feet of display explained the function of "percs" as well as showing the colors, texture and physical composition.

COA member **Jim Cordy** won his COA Award at the Sarasota Shell Show, Feb. 16-18 of 2001. His exhibit, "It's Better in the Bahamas," displayed an amazing 45 feet of shells self collected from the Bahama Islands over a period of several years. Great job, Jim!



Fossil collector **Dale Stream** was the COA winner at the St. Petersburg Shell Show of 2000, with his 16 feet of "Fossil Shells of South Carolina." The exhibit was a huge hit with the judges, other exhibitors and visitors alike. Our congratulations Dale!

In our next issue . . .

American Conchologist just keeps getting better and better. In our next issue (September 2001) you'll read about a magical place in the Gulf of Mexico called Dog Ballard Reef. Many of you may recall from previous issues of our magazine that author **Jim Miller** has dove there in the past and found unusual specimens of *Argopecten irradians concentricus* as well as, more recently, an area covered with literally tens of thousands of *Strombus alatus* (see photo at left). But there's much more to Dog Ballard than just shells, as you'll learn in September. Also on tap is an exclusive article from **Neil Fahy** on his search for the landshells of Guatemala. We also have a feature on the "mysterious" *Melongena corona sprucecreekensis.* Plus a very special report from the **COA Convention 2001**, more great photography and as always, a few surprises. So don't miss an issue — if you're not a member and are reading someone else's copy, give it back and join! We have authors working right now on a number of fascinating articles that you just won't want to miss. 2001 has already been an incredible year and it's only going to get better!

I'm Dreaming of a White . .

— Continued from Page 26

carried by both parents, in order to be expressed in the offspring. An albino which mates with a pigmented individual will produce all pigmented offspring, unless the normal-colored parent carries the unexpressed recessive gene. Albinism is also associated with certain health risks, particularly increased susceptibility of the skin and eyes to damage from ultraviolet radiation. Probably the principle factor responsible for the extreme rarity of albinos among small mammals and birds is enhanced visibility to predators. A white coat is likely to result in early demise for a quail or rabbit which would normally depend on cryptic coloration as its first line of defense. Among mollusks, such factors are probably minimalized. An aquatic habitat filters out harmful UV rays, and most mollusk shells are fairly opaque, even when unpigmented. Also, many species are nocturnal, or live their lives under rocks or buried in sediment. And, many of the major predators of mollusks locate their prey primarily by means other than visual. As a result, it is sometimes possible for albinism to become atypically commonplace within a geographically isolated, inbreeding population of mollusks.

In several Atlantic species of Cardiidae (from both European and American waters) albinism is relatively common, with a species-wide incidence greater than 1 in 100. In certain specific localities however, albinos may account for nearly half the total population. The same is true of the Great European Scallop (*Pecten maximus*). Some years ago I made several trips to a scallop-shucking plant in Maine, to collect deep water shells as they tumbled off a conveyor belt into the big dumpster behind the plant. The "New England Neptune" (*Neptunea lyrata decemcostata*) was common. I would find at least thirty or forty specimens on each visit. On a couple of occasions, I was rewarded with a pure white albino, the highlight of the excursion. Then, one steamy summer afternoon, seven albinistic *Neptunea* came off the belt in little more than a half hour. Undoubtedly all of these rare specimens came from the catch of a single scallop boat which was being unloaded at that moment, and which had trawled through a localized population in which the frequency of albinism was many times greater than in the species as a whole. Some localized concentrations of albinos are well known to conchologists, such as the albinistic "sieve cowries," dubbed "*Cypraea cribraria melwardi*," from a small area in eastern Australia.

Although color alone is not a valid criterion for taxonomic separation under the International Code of Zoological Nomenclature, many names have been assigned on that basis, and it is little surprise that the visually striking albinistic forms have gathered more than their share of such appellations. In addition to the *Cypraea cribraria* form noted above, the cowrie clan claims *C. hesitata howelli*; *C. thersites eburnea*; and *C. marginata albanyensis*, all unpigmented forms of normally pigmented species. But the largest number of named albinistic forms is to be found in the gastropod family where albinism is probably most commonly observed—Olividae. *Oliva reticularis olorinella*; *O. incrassata nivea*; *O. bulbosa immaculata*; *O. sericea albina*; *O. lignaria albescens*; *O. oliva candida*; and *O. annulata alba* are a few examples. Though such names may not be officially recognized, collectors often find them a useful means of designating distinct and interesting forms.

We should keep in mind that albinistic means more than simply "white." It means lacking pigmentation by virtue of a specific genetic cause. Some animals are white for reasons unrelated to actual genetic albinism. If you ask a child to name a white animal, the most likely response is "polar bear." Polar bears are white, but they are surely not albinistic, since their eyes, mouths, internal organs, and even their skin (which is nearly black under their white fur) all contain a normal distribution of melanin. Likewise, — most white domesticated cats, dogs, horses, etc. are not albinos, though albinism is a possibility in all such species. Pet white rabbits and white rats generally are true albinos, and lack pigmentation everywhere, including their eyes, where the presence of normal blood circulation produces the pink eye color typical of albinistic vertebrates. The large, common "egg shell" (*Ovula ovum*) is as white as snow—on the outside; but its dark brown interior reveals that it is not an albino.

Often it is difficult, if not impossible, to know whether a particular white shell is truly albinistic, or unpigmented from some other cause. If a particular species is always white, it may be descended from ancestors which never developed pigmentation—or possibly from an albinistic subpopulation within a pigmented ancestral species. The beautiful white "ivory cowrie" *(Cypraea eburnea)*, from the South Pacific may well have originated in this way. But, there is no way (except, possibly, complex DNA analysis) to know for certain. It is usually listed as a distinct species, but some writers, noting its morphological similarity to the widespread Indo-Pacific *Cypraea miliaris*, still consider it a southern, albinistic form of that species. Some species, like the Florida lightning whelk (*Busycon sinistrum*) gradually lose their pigment-producing capability as they grow older (sound familiar?). The colorful juveniles gradually become lighter in color as the shell grows, and the more aged specimens are almost always completely white. A small, unpigmented lightning whelk therefore is most likely an albino, while a large white specimen probably is not.

In extremely variable species, the question of albinism is often not clear-cut. For example, the European *Chlamys varia* and the Caribbean *Chlamys sentis* both occur in a wide range of colors, including black, purple, orange, yellow, and white. Some specimens are extremely light yellow, approaching white. Therefore it is questionable whether white specimens are truly albinistic, or just represent the lower end of the broad range of normal coloration. Similarly, the common Tiger Cowrie (*Cypraea tigris*) shows a range of dorsal pigmentation from totally white to totally black. A totally white shell is likely to be listed as an albino, and will command a high price, based on its extreme rarity. But is it actually an albino? Another specimen may have only two or three small dark spots on an otherwise white dorsum. This shell is certainly not albinistic, since it is capable of producing melanin. Dealers commonly list such a sparsely marked specimen as "semi-albino" or "near albino," a term which is descriptively useful, but probably not technically accurate. One is led to suspect that both the totally white shell and the sparsely spotted one represent simply the outermost position on the bell curve of "normal" pigmentation. On the other hand, an all-white *Strombus alatus* with a violet aperture might well deserve the designation "semi-albino," or to be more accurate, "selectively albino." In other words, the abrupt absence of normal pigmentation may well be due to true genetic hypopigmentation, but an unaffected gene controls the apertural pigment.

A few years ago I received, from a collector in western Canada, some large, frilly *Nucella lamellosa*, in various color forms, including a few albinistic specimens, for which he asked a small premium. Since he told me the white shells were scarce, I didn't mind the additional value he placed on them. Some time later I corresponded with a different collector, in Oregon, who also offered *N. lamellosa*. She was a bit puzzled when I inquired about albinistic specimens, since virtually all the specimens in her immediate area were white. It was only then that I realized this distribution precisely parallels that of the smaller *Nucella lapillus* of my own region. On rocky shores in Maine I have seen intertidal boulders virtually covered with these "dogwinkles," some solid colored, others banded in black, brown, gray, red, orange, and yellow—not a single white shell to be seen. Two hundred miles south, in northern Massachusetts, similar shores harbor similar numbers of dogwinkles, more than 99% of which are pure white. I suppose when you notice a white individual among scores of colored ones, the term "albino" jumps out at you; but seeing hundreds of white snails clustered together in one location just doesn't bring that term to mind. In fact, it suggests that the white specimens of such species may not actually be albinistic—but who can say for sure?

In speaking of molluscan albinism, another question invariably arises. I have been addressing the subject as conchologists typically do—in terms of the shell. However, the term "albinistic" refers to the whole animal, not just selected parts. We cannot say the polar bear has albinistic fur, but is otherwise normally pigmented. Should we then refrain from describing a shell as albinistic, unless we know that the soft parts of the animal were likewise unpigmented? Experience indicates that such an approach would render molluscan albinos virtually non-existent. In the many accounts I have read of live-collected, abnormally white shells, none have indicated that the soft parts of the mollusk were also white. In many instances the soft parts were normally pigmented; in other cases, more lightly than normal, in the opinion of the collector. The few conchologically albinistic specimens I have personally collected, including *Buccinum undatum*, *Lunatia heros*, and the *Neptunea* mentioned above, all had normally pigmented soft parts. On the other hand, a local aquarium store was offering "albino apple snails" (probably a form of *Pomacea bridgesi*), in which the entire animal was snow white—EXCEPT the shell, which appeared light orange. However, the apparent shell color may well have been due to a thin overlying periostracum. I didn't want to spend $15.00 to find out. So, in the final analysis, perhaps it is most useful for conchologists to continue to apply the term as our specific tradition has it in reference to the shell alone.

Speaking of periostracum . . . the "perio" and corneous operculum of an albinistic snail will not be white. Shells are made of a white substance, calcium carbonate, and

conchologically albinistic specimens I have personally collected, including *Buccinum undatum*, *Lunatia heros*, and the *Neptunea* mentioned above, all had normally pigmented soft parts. On the other hand, a local aquarium store was offering "albino apple snails" (probably a form of *Pomacea bridgesi*), in which the entire animal was snow white—*except* the shell, which appeared light orange. However, the apparent shell color may well have been due to a thin overlying periostracum. I didn't want to spend $15.00 to find out. So, in the final analysis, perhaps it is most useful for conchologists to continue to apply the term as our specific tradition has it in reference to the shell alone.

Speaking of periostracum . . . the "perio" and corneous operculum of an albinistic snail will not be white. Shells are made of a white substance, calcium carbonate, and become colored only by incorporation of other substances—pigments. Periostracum and opercula are made of a brown substance, conchiolin, which does not owe its color to the presence of any additional substances. Therefore in the total absence of pigmentation, structures composed of conchiolin are brown. In some families, the operculum is shelly, or calcareous, and one might naturally suspect that such a structure would be white if the shell were white. This is not the case. The operculum is secreted by the opercular disc, on the dorsal aspect of the foot, not by the shell-secreting mantle, and the pigmentation of the operculum, if any, is unrelated to the coloration of the shell. Hence, pure white opercula are often found in mollusks with brilliantly colored shells like *Turbo reevei*, *Phasianella australis*, and many *Natica* species; while a colorful operculum may be associated with a white shell, as in *Astraea rotularia*. In Neritidae, the opercula are pigmented, but are typically very uniform in color and pattern throughout a species, while the shells of the same species may be wildly variable. Therefore the operculum would retain its normal coloration, even if the shell were albinistic.

The entire subject of molluscan pigmentation is largely shrouded in mystery. Why would a creature living in the depths of the sea, where light never penetrates, produce a complex pattern of brilliantly colored pigments, which can be appreciated only in the presence of light? Interestingly, in the earth's other light-free environment, deep subterranean caves, many apparently albinistic species of animals do occur, including fishes, crustaceans, insects, worms, mollusks, and other forms. Many of these are not only colorless, but also eyeless, both very logical adaptations in a world of perpetual and total darkness. Why hasn't the same thing happened in the abyssal ocean? Beats me! Even in the case of shallow water organisms, one wonders why a snail would decorate itself so elaborately, only to conceal the whole work of art under a thick brown periostracum. Numerous theories exist regarding the purpose of pigment deposition in the shell, but they are difficult to prove. The existence of albinos however, does seem to put some such ideas to rest. For example, one theory suggests that the pigments incorporated into the shell are simply an accumulation of metabolic waste products, and that the resulting color and pattern are only inadvertent byproducts. However, if this were so, we would have to conclude that albinos either produce no waste products, or have a unique way of disposing of them, both highly unlikely hypotheses. It has likewise been proposed that shell pigmentation somehow results in greater structural integrity. But if so, we would expect albinistic shells to show obvious weakness, compared with their colored counterparts, and that does not appear to be the case.

I have occasionally been asked how to tell the difference between a true albino and a "bleached" shell. This depends on what you mean by "bleached." Ordinary laundry bleach (such as Clorox) does not remove colors from shells; in fact bleach is commonly used in cleaning shells. Therefore a "bleached" specimen, in this sense, is not white, and would not be confused with an albino. A second meaning of "bleached" is "sun-bleached," a shell which has lain on the beach, baking in the sun for some time, and has had its pigments destroyed by ultraviolet radiation and heat. Such a specimen is usually not too difficult to distinguish from a live-collected albino because (1) seldom are the pigments completely destroyed—there is usually some evidence of the original color and pattern visible, at least when the shell is wet, and (2) any shell which has been on the beach long enough to become sun-bleached is likely to be somewhat weathered by rain, wind-driven sand, etc., and to show some degree of pitting, reduced gloss, etc., which clearly mark it as a "beach shell." A third form of "bleaching" is the deliberate destruction of pigment by baking a shell at high temperature, to produce an apparent albino. When I read about this some years ago, I tried it on some expendable specimens, just to see if it worked. I placed them on an asbestos pad, and baked them in the oven at about 300 degrees F (150 degrees C) for an hour. Then, to avoid cracking from sudden temperature shock, I turned off the oven and let it gradually cool, without opening it. Shells having a dark pattern, like *Conus marmoreus* or *Terebra subulata* showed substantial lightening of the colors. However, shells having fairly light patterns like *Conus textile* or *Oliva reticularis* came out pure white or very nearly so. The olives in particular would be difficult to tell from natural albinos. Something to keep in mind if someone offers you albinistic specimens.

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Some Oliva species of the Mid-Pleistocene of southern Florida

— Continued from Page 18

varieties (possibly subspecies) of the modern forms. However, until the rigorous analyses are made, and until anatomical and/or biochemical studies corroborate the morphometric results, it is best to use the valid names and indicate that they are questionably equal to *O. fulgurator*.

There are three other species named from the Bermont by Petuch (1994) which are described from a Dade County locality and may all represent deep water, coral reef or other environments not found at South Bay. These, and other forms from other Bermont localities, must wait for further study.

I would be happy to lend my specimens to anyone who wishes to do a good statistical analysis of these specimens using the criteria of Tursch et al, 1998.

Acknowledgements: I would like to thank Andrew Rindsberg, Geological Survey of Alabama for help with the manuscript, Roger Portell, Florida Museum of Natural History for data and other support, and Phyllis Diegel for all her help.

Key to the *Oliva* Species: South Bay Bermont Fauna

1. Protoconch of about 2 1/2 wide, flat whorls. Go to 2.
   Protoconch of three conical whorls. *O. sayana*.
2. Spire basically smooth sided except for narrow notches between whorls. Go to 3.
   Spire showing stepped whorls, no notches. *O. edwardsae*.
3. Columella protrubent. Go to 4.
   Columella nearly straight, teeth weak, shell tapered. *O. lindae*.
4. 14 to 18 teeth, noticeable shoulder. *O. cokyae*.
   20 to 22 teeth, rounded. *O. southbayensis*.

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CONCHOLOGISTS OF AMERICA, INC.

VOL. 29 No. 3 SEPTEMBER 2001

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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MEMBERSHIPS are for the calendar year, January-December, late memberships retroactive to January. 2002 DUES: (USA) $20.00; Postal surcharge: $5.00 for Canada and Mexico; $10.00 for other Western Hemisphere nations; $12.00 for Europe; $15.00 for Asia, Africa and the Pacific Rim. Please pay in U.S. dollars, or with a check on a U.S. bank with Transit Enrouting and Account Numbers printed at the bottom, or with money order; make checks payable to CONCHOLOGISTS OF AMERICA. **NEW MEMBERS** apply to Doris Underwood, MEMBERSHIP DIRECTOR. **RENEWALS** go to TREASURER, Phil Dietz. **BACK ISSUES** are available from PROPERTIES DIRECTOR Hank Foglino, 4 Trent Court, Smithtown, NY 11787-1266. Prior to 1985 $3.00 each; 1985 to current $5.00 each.

President's Message

Those of you who missed the COA convention in Cape Canaveral certainly missed a great time. The programs were stimulating, the conventioneers were terrific and a good time was had by all. Special thanks go out to the Astronaut Trail Shell Club for all their hard work. Of course I don't think future conventions can beat their finale. At 5:30 AM, the day after the convention ended, many of the conventioneers gathered outside the hotel for a spectacular liftoff of the space shuttle.

Thank you to the membership for your vote of confidence in reelecting the Board of Directors. We will continue to strive to make Conchologists of America bigger and better. Be sure to look in the June issue for the newest ways to donate to COA. We will be working with groups and individuals on donations and fund establishment.

As we continue into this bright new century, there are many challenges ahead for COA: to become more proactive in the field of conservation, to encourage meaningful dialog among members on shell subjects, and to introduce and encourage new shellers in this wonderful hobby.

Looking forward to seeing all of you at our 2002 convention! If you have not heard the 2002 news, it's Sarasota (see page 3 for additional information)! And do get your plans underway to join us in Seattle, Washington for the COA convention in 2003.

Betty Lipe

ABOUT THE COVERS

Our September cover is an arresting piece, a papier maché sculpture by **Michael G. LaFosse** entitled "Strombus gallus III". This larger than life piece is 30 inches long (76 centimeters); the papier maché is a lay-up of handmade Abaca paper pulp, calcium carbonate, acrylic medium, and iron oxide pigments.

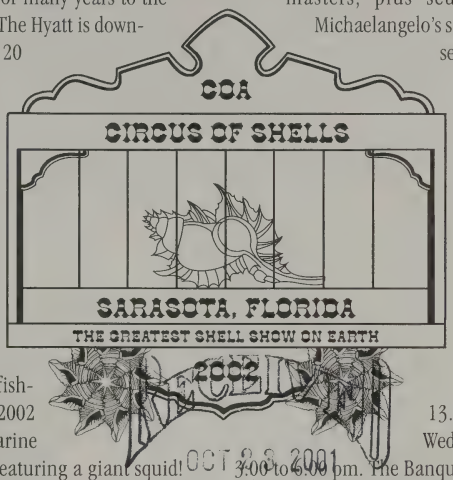
This amazing sculpture (dorsal view below) is from the collection of Richard L. Alexander. Photo credit: *Michael Lafferty*. For more about Michael La Fosse, see the feature on page 28.

Our back cover also has an interesting story behind it. You can find complete information on this fascinating series of photographs on the inside back cover with text by **Phil Poland** describing his unique experience with "tree snails in love."

COA 2001 is over. Now plan for COA 2002: A Circus of Shells!

by Peggy Williams, Convention 2002 Chairman

COA 2002, "A Circus of Shells" will be held at the Hyatt Hotel in Sarasota, Florida, the city which was home for many years to the Ringling Brothers, Barnum & Bailey Circus. The Hyatt is downtown but right on the water, within a mile of 20 or more excellent restaurants, lots of shops (including a number of unique antique and thrift shops), and even a couple of shelling spots.



The Sarasota Shell Club will be hosting the event — and we plan to keep you very busy! Besides nearly two days of programs, the Auction, and the Bourse, we will definitely be offering attendees a wading field trip and dive trips and are hoping to find a shell pit willing to let us go fossil hunting. We're also looking into offering a fishing trip along with shellcraft workshops. The 2002 Welcome Party will be held at the Mote Marine Aquarium with its brand new Mollusk Hall, featuring a giant squid!

If you should happen to get tired of shells and shopping, you can visit the Ringling Museum of Art, a first-class facility featuring giant cartoons by Rubens and original paintings by many Italian and Dutch masters, plus sculptures including a bronze cast of Michaelangelo's statue of David. There's also the Ringling Museum of the Circus and the home of John and Mable Ringling, a 1920s-era mansion on the Bay.

We also have the world-famous Selby Gardens featuring many rare orchids, the Jungle Gardens where Selma Lawson's shell collection is on display, and Myakka and Oscar Scherer State Parks, great bird watching areas.

The fun officially starts on Saturday, July the 13th with early afternoon programs. If we manage a fossil field trip, it will be either the morning of July 12 or 13. The wading trip is scheduled to begin Wednesday, July 17 after the Bourse closes, from 3:00 to 5:00 pm. The Banquet will be held mid-convention, on Monday evening. It's never to early to add COA 2002 to *your* calendar!

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Publication Announcements

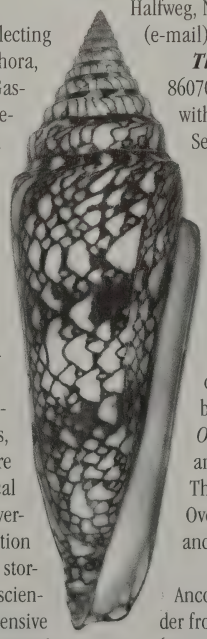
The Molluscs of the Southern Gulf of Thailand by C. Swennen, R. G. Moolenbeek, N. Ruttanadakul, H. Hobbelink, H. Dekker, & S. Hajisamae will be available in October 2001.

This identification guide is the result of 8 years of collecting in which the occurrence was established of 2 Polyplacophora, 229 Bivalvia, 6 Scaphopoda, 17 Cephalopoda, and 277 Gastropoda in the Southern Gulf of Thailand. Some of these species are new to science, others have never been presented in color before, and several species were not known from Thailand. The fauna in the Gulf of Thailand shows relationships with that of Malaysia and Indonesia, but some species were known only from India or Hong Kong.

All species are pictured on 44 plates with color and SEM photos, and more than 200 original drawings. There are also 10 color plates with 28 photos of field situations, fishery methods, traps, and the egg masses of certain gastropods.

The 211-page hardbound book is A4-size. Species accounts give scientific, English and local names, descriptions, abundance, ecological notes, localities where the species were found, and human use. The general text covers the physical characteristics of the area and the habitats, provides an overview of the local mollusk fauna, gives a general introduction to taxonomy and nomenclature, and includes collecting, storing, and identifying information. A checklist, an index for scientific and English vernacular names, a bibliography, an extensive glossary and a map of the area indicating the locality names used in the species accounts complete the book.

The price of the book will be Hfl. 105.00 [postage excluded]. No discounts are given. For ordering and additional information contact Mr. A.N. van der Bijl at: Burgemeester van Bruggenstraat 41, 1165 NV Halfweg, Nederland +31-20-4977772 (phone) *anvdbijl@xs4all.nl* (e-mail).



The Genus* Oliva *and the Species Problem (ISBN 86070-17-9) by Bernard Tursch and Dietmar Greifeneder Ancona, with two sections co-authored by Yuri Kantor will be available September 2001.

In order to tackle the "*Oliva* problem," this book first addresses the general problems met by every intelligent malacologist: What do we consider to be a Species? How can we deal with variation? How do we measure shells and interpret quantitative data? How can we interpret differences in shape and color pattern? In practice, how can we demonstrate the existence of separate species? It then treats anatomy, shell microstructure, ecology and ethology in detail, including many new observations. Upon these bases, a critical revision of the notoriously difficult genus *Oliva* is presented. The book includes a complete synonymy and photographs of nearly all the available type material. The 74 living objective morphospecies are discussed in depth. Over 1150 colour photographs illustrate their variation range and many novel identification tips are given.

Distributed by: L'informatore Piceno, CP 421, 60124 Ancona Italy, the book's price is approximately 111.00 US$ Order from: Mostra Mondiale Malacologia, Via Adriatica nord, 240 - 63012 Cupra Marittima (AP) Italy. Phone:+39-0735-777550 or +39-071-2802582 Fax:+39-0735-777232. E-Mail: *malacologia @fastnet.it* (Tiziano Cossignani)

Hammock hopping and the reward of the day

by Mark W. Johnson

It's hot. It's really hot. The rain shower that was passing through has now passed, and the sun has returned with a vengeance. The high humidity isn't allowing evaporation, and I am soaked with perspiration. The trees in the hardwood hammock stifle the lazy ocean breeze that normally caresses these parts of south Florida, and the mosquitoes have found me once again. The hot air is alive with the endless buzz of various insects, and the ineffective insect repellent in which I am covered is mixing with the sweat running down my face, burning my eyes. Paper wasps nesting under every other Sabal Palmetto threaten me regularly, and I have been stung once today already. I have to pause to brush away the minute, biting ants every few moments, and I am covered with tiny scratches from the multitudes of unforgiving thorny vines and shrubs. I just heard the terrible and unmistakable buzz of a rattlesnake as it rustled away beneath the dense brush. I never saw it, but I won't forget that noise for a long time.

My camera is taking a beating of its own. Continuously taking it out of my backpack and then replacing it is way too tedious and time consuming (speed is everything when you're shooting nature), so I have it slung over my head. The camera body, a Nikon F4, is generally bullet proof (the sole reason I own it), but the auto-focusing lens is already protesting the grime as well as the showering it took earlier, threatening to warrant a costly replacement for the third time. My lens cap was knocked off and lost over an hour ago. I just fell down. I am overheated. I am tired. I am covered in spider webs and, most likely, the spiders. I have a rapidly advancing poisonwood rash on my left forearm. I am filthy. I am all alone. The internal voice that has guided me on so many past adventures is opting for sitting on the couch back home.

The reward of the day for the author: It is estimated that only one out of 10,000 *Liguus fasciatus* may be sinistral, as is the snail on the left.

You're probably wondering what I'm doing here. I am wondering the same thing myself. But, alas, I am photographing nature, particularly snails, in the beautiful yet menacing splendor of the hardwood hammocks of Southern Florida. Of particular interest to me today is the Florida Tree Snail, *Liguus fasciatus* (Müller, 1774). Considered a single species, this tree-dwelling pulmonate has some fifty-nine named color varieties, many of which can readily be observed in the hardwood hammocks of the Florida Keys and the Everglades. From fully albinistic to richly hued in every color of the rainbow, no two color varieties are completely alike. After the passing summer rain shower, the snails are actively out and about, feasting on the soot mold, fungi and lichen growing on smooth-barked trees, particularly the Wild Tamarind (*Lysiloma latisiliqua*) and the Jamaican Dogwood (*Piscidia piscipula*). The snails will feed and grow during the summer, then mate and lay eggs early in the fall, climbing down the tree to deposit their eggs under a couple inches of leaf litter. The Liguus will estivate (a snail's answer to hibernation) during the dry winter months, attaching the aperture of the shell to a tree by means of a hardened mucus seal called an epiphragm. In the spring, the snails will come out of estivation, the eggs will hatch into tiny replicas of the parents, and the process will repeat itself.

These beautiful and delicate shells are extremely interesting to me, as are the many stories told by "old time" collectors who studied, transplanted, and collected Liguus more than a decade before I was born. With perhaps the exception of the Queen Conch, there isn't a single species of Florida mollusk that has fascinated and captivated collectors more powerfully than *Liguus fasciatus*.

Prior to the late 1980s, thousands of Florida *Liguus* were being taken annually by scores of collectors. Ultimately, due to a combination of collecting pressures and widespread development, the species was named by the Florida Game and Fresh Water Fish Commission as a "Species of Special Concern," thereby outlawing collecting of either living or dead *Liguus*. Under legal and conservation pressures, most snail enthusiasts now brave the hammocks either to observe and study the snails or practice "collection by photography," which is what brings me here.

Archie Jones, the acknowledged authority on Florida Tree Snails, says that a person needs two traits to effectively study Liguus in their natural environment. The first is high endurance. The second is a low IQ. Did I forget to mention that it's hot?

I feel confident that my efforts of the day have netted some reasonably good shots of five or six color forms. It's really quite fortunate for me that it rained earlier. Although the camera and I both got soaked, the *Liguus* have come out of hiding and are actively crawling about the trees, making for some great shots. But now the Gatorade is finally gone, and I just ate my second mosquito (interestingly enough, the things will actually fly in your mouth if you leave it open long enough). As I load my fifth roll of film into my camera, now over two hours into my jaunt, I decide it's about time to return to my car.

As I begin the long and laborious process of removing myself from this beautiful yet tiresome place, I notice more snails that I didn't see earlier. On the tree directly in front of me, right at eye-level, are two bright white *Liguus fasciatus* that are modeling a naturalist's dream (my dream, anyway): side by side, they are climbing a small sapling, both animals extended from their shells. The shells are in a dark setting, but I decide to try to get a picture anyway. I raise my camera to take a picture, then stop dead in my tracks. The shells are a mirror image of each other. One of the shells is sinistral!

I slowly close my eyes and open them again. A bug bites me. The *Liguus* are still there, slowly making their way up the tree, side by side, and one of

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Photo by Mark W. Johnson

New Caledonia: A French Paradise

by José Coltro Junior

When I was 12 years old I was wild about geography; my major desire was to travel the world. When somebody asked me at what I wanted to be when I grew up, I always answered "Tourist!" I'd read everything about travel: great places, wild places, exotic places. On my list of places I wanted to visit, in order of importance, of course, New Caledonia was near the top. But, young as I was, I hadn't any money to travel, so I had to wait 28 years to go there.

At the Houston 2000 COA Convention, Noumea shell dealer Vincent Crayssac convinced me to visit New Caledonia. Our best diver, Alfredo Bodart, accompanied me on the 20-day trip. The 12-hour flight from Los Angeles to Noumea was full so Alfredo and I had to sit together — remember, I weigh 135 kilos! Poor Alfredo. Vincent transported us (at 1 AM!) from the Tontouta International Airport to Noumea and our very nice Novatel Hotel.

A French territory, New Caledonia is big — about 400 km X 70 km. Northeast of Australia between the Coral Sea and Fiji, it has three archipelagos around the main island: Belep to the northwest; Loyaute to the east; and Pine Island to the southeast. The mountainous main island (Mt. Humboldt is 1630 meters) is lush tropical rain forest in the temperate east; the windy west is dry, all bushes and grassy fields. The world's second largest producer of nickel, New Caledonia suffers much environmental destruction., especially in the mountains. Though I'd come during rainy season, no rain fell my entire trip.

Nerites and other fresh water species found in New Caledonia

That day, we moved to The Staley, a hotel with more shelling facilities, a perfect place for our mess. Seaside on Pointe Aux Longs Cous, it was fine for snorkeling, which we did for the next two days. Noumea is unlike other Oceania towns — very French, clean, elegant, and charming. Everybody seems to have at least one boat. But the large mangrove area around the island makes it look more like Ilhabela, here in Brasil, than a Pacific paradise. One afternoon Alfredo and I visited Vincent at his beachfront apartment. While I was looking at his shells, Alfredo snorkeled the rocks. Vincent said Alfredo probably wouldn't find anything, but my "dredge man" amazed Vincent. He found a gorgeous *Cypraea stolida*, beautiful *Trochidae* and the very rare *Haliotis dissona* (Ireadle, 1937).

No luck snorkeling the outside reefs of Noumea for niger and melanistic cowries, nor in the other classic locality, Prony Bay. A stop to look for land shells was equally disappointing: gorgeous *Placostilus* have disappeared. The place is full of *Achatina fulica*! Bare mountains are heavily eroded: just poor grass with small bushes. Few primary forests are protected on this part of the island. Vincent also took us to Poé Beach, north of Noumea, one of the few real tropical paradises on the main island: pure white sand with an amazing blue sea. We went there to look for the *Conus marmoreus suffusus* and *C. marmoreus "bâtard form."* We found very few but it was very nice to snorkel there. It was a great day. Alfredo and I rented a car to circle the island. The original islanders, the Kanacs, inhabit the east, each beach with a local tribe unfriendly to the French. We had no problem. Driving north, we crossed the island to Houailou. Unlike the perfect roads in the west, the eastern roads can be really bad. The Kanac don't want tourists.

Crossing the tropical-forested mountains, we reached the clean, calm sea and asked the villagers to shell their beaches. On the road they sell handicraft, bananas, and shells, leaving goods marked with prices; you take goods, leave money: an easy exchange based on trust. I took some bananas, left coins.

Club Med at Hienghene has a hotel, bungalows, a private beach, and an artificial rock reef marina/guest pool. Alfredo snorkeled there, finding dozens of lobsters and great shells: *Vasum ceramicum* (L., 1758); *Astralium stellare asteriscus* (Reeve, 1842); *Turbo sparverius* (Gmelin, 1791); *Oliva miniacea johnsoni* (Higgins, 1919). What a surprise when we followed the coastal road north to explore a waterfall: fantastic *Neritidae*! *Neritina chlorostoma* (Broderip & Sowerby, 1833); *Neritina pulligera* (L., 1767); *Neritina sandalina* (Rècluz, 1842); *Septaria borbonica depressa* (Lesson, 1832); *Septaria porcellana* (L., 1758); *Theodoxus brevispinus* (Lamarck, 1818) and *Theodoxus coronatus* (Leach, 1815).

At Malibou Beach resort we went to Boat Pass to look for shells. After a rough drive on bad roads, we reached our snorkel site at the end of the island, left the car and were almost killed by billions of mosquitoes after fresh blood! Once in the water, we found large *Chicoreus ramosus* (L., 1758). It was my first time so I selected the two best. Alfredo took only one — his hands were full of other species, like the giant *Atrina vexillum* (Born, 1778). We

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A. *Clanculus thomasi* (Crosse, 1864)
B. *Conus bandanus nigrescens* (Sowerby, 1859)
C. *Halotis dissona* (Iredale, 1937)
D. *Rhinoclavis fasciatus* (Bruguiere, 1792)
E. *Strombus erythrinus* (Dilwyn, 1817)
F. *Pyrene turtrina* (Lamarck, 1822)
G. *Astralium stellare asteriscus* (Reeve, 1842)

Photos by Marcus Coltro

New Caledonia

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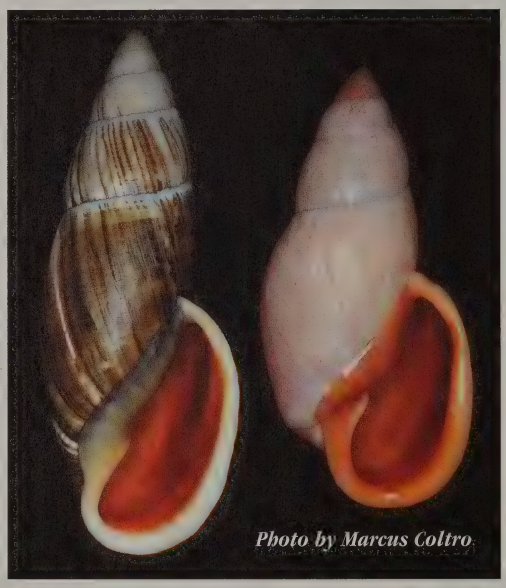
came back to the hotel happy. Early next morning en route to Noumea, we stopped at Poé Beach again. The weather was much better and the lagoon was like a huge swimming pool! There we found multiformed *Conus marmoreus*.

Back in Noumea we met Vincent's friend, Jean-Paul. We planned four days with him at the fabled Pine island. Jet boating for two hours, I arrived (very seasick) on Pine Island with Alfredo, Vincent and Vincent's partner, Gilles. Jean-Paul was to meet us on the pier. He wasn't there. There we stood, loaded for a boat trip: heavy equipment, food, and no boat! Others quickly dashed off to rent rooms. It's a wonderful place with some of the most beautiful beaches I've seen, but the locals don't want heavy tourism. Only a few small hotels and campgrounds exist, except for the fantastic and costly Le Meridién at Gadji.

Vincent reached Jean-Paul--misunderstanding! He was expecting to meet us on Saturday! We loaded up the heavy gear for the walk to the beautiful Kanumera Bay to find lodging. Even walking on sand carrying heavy luggage, I was very happy to be there. But of course, no rooms! At the third hotel the manager offered two tents. I had never slept in a tent. A small tent at that. With a single, smelly mattress for both Alfredo and me. I made quite a picture going in and out of the tiny tent.

We went shelling to forget our problems. Vincent knew a spot for nice *Conus marmoreus crosseanus*. By bike! I last biked in 1976 when I weighed only 80 kilos. I had a big accident and broke my elbow. At Pine Island I was 40, 135 kilos, and completely lazy. I took a few very comic minutes remembering how to ride a bike. The local road was good, but uphill, downhill. Soon Vincent, Alfredo and Gilles were far ahead. They quickly disappeared, but I was barely moving. Then the bike broke! Well, I thought, Vincent said it's not far. I'll carry the bike. The sky was completely cloudless, empty except for the midday summer sun. The temperature was over 30° C and I was in shorts and sandals. I walked and looked for land shells. But Vincent said it's not far. An hour later I was sweating liters, dying for water, my feet hurt and I couldn't find them. In a small village I begged a child watering plants for water — the best I ever had! The village has three other roads. I walked eight kilometers and never found them. A man stopped his car and asked what happened to my bike. He was the owner of the bike rental. He fixed the bike, and gave me a ride.



***Placostylus fibratus bairdi* (Reeve, 1848) and *P. fibratuspeculiaris* (Kobelt, 1891)**

Back at the campground at 4 PM, starved and exhausted, I went straight to the restaurant. One must order in the morning what one wants to eat each day — we didn't know about these rules. The girl at the restaurant saw my sad face and gave me a sandwich of bread, ground ham, and ground carrots. Soon Vincent and the others arrived with some shells, but no *Conus crosseanus*.

After a cold shower, I went to sleep. I found out why I had never liked camping — too much nature around. Sand on the bed, insects on my legs, mosquitoes, no comfort. Sorry, I am not a good adventure man. I woke up extremely early, and enjoyed the view from the tent. Alfredo snorkeled the bay where he found a dead, rostrate *Cypraea vitellus*, the first specimen found on the island!

Vincent suggested going back to yesterday's location. On bikes! He wanted to check out the other side of the bay. I preferred to stay behind and snorkel in the bay. It has a very beautiful reef, but almost no shells, so I found very few species. After lunch (another ham and carrot sandwich) I picked my tenderfooted way to the jet boat pier where I found large *Conus quercinus*. The others returned emptyhanded so I showed off my finds. Alfredo went off to hunt more, and he came back with huge specimens.

Back in our bay, he found two of the rare *Terebra caledonica* (G.B.Sowerby, 1909). It was the first really exciting shell found. Around the campground we found large *Placostylus fibratus bairdi* (Reeve, 1848); *Placostylus fibratus ventricosus* (Kobelt, 1891); *Allodiscus perroquiniana* (Crosse, 1869); the rare sinistral *Draparnaudia singularis* (Pfeiffer, 1854); pink *Gassiesia couderti* (Fisher & Bernard, 1856); and other species.

Vincent tried to compensate for our troubles by asking the campground boat to take us to beautiful little Brosse Island. The prospect of a nice day kept my spirits up in spite of another rough night. But in the rush for the boat, Vincent forgot to order lunch and drinks for the trip. Not to worry, he said, we'd have no problem finding lobsters! We arrived at Brosse Island, a coralline island of white sand, blue water and lots of endemic pine. We walked to the other side of the island to be close to the reef. I looked for some shells in the pools and we started to find some nice ones, including the rare *Nerita filosa* (Reeve, 1855). But we didn't find a single lobster.

We had to meet the boat at 4 PM, so at noon we started back. Vincent suggested crossing the banana-shaped island the "short way." We found some nice *Placostylus fibratus peculiaris* (Kobelt, 1891). But the trip was torture. My feet were hurting but Vincent forgot to bring any shoes! After about 25 minutes in the pine forest I noticed the sun shadow had moved from my left to my right — Yes, we were lost in the forest! The shortcut took us four hours and special boat rescue! Between Brosse Island and the campground, the boat used the entire tank of fuel so we had to wait for the waves to wash us to Pine Island. Of course we stopped a long way from the campground and had to walk back. When I arrived I was in such a state that I asked Vincent to call Le Méridien Hotel for a reservation for my last night on the island. Vincent tried to talk me out of it, telling me about how expensive it was, but I really felt I deserved it. I finally had a wonderful dinner at this excellent hotel and a fantastic night. A great surprise next morning: Alfredo snorkeling in front of the hotel, finally found some nice *Conus crosseanus*! Pine Island deserves to be better explored!

We left for Noumea Saturday afternoon. There, Vincent took us to some "secret" places where Alfredo finally found a beautiful niger and rostrate *Cypraea caurica*, some rostrate *Cypraea vitellus*, and many other small species: *Clanculus thomasi* (Crosse, 1864); *Pseudostomatella maculata* (Quoy & Gaimard, 1834); *Cypraea humphreysii* (Gray, 1825) and more. After two weeks collecting we eventually had around 500 different species — nothing too rare, but some really nice shells.

We spent our last day being tourists. Vincent took us to some great places. Especially impressive was the Cultural Center of Tjibaou, a most outstanding modern architectural construction. Then we learned there was an 8-hour delay of our flight back to Los Angeles. This gave us an extra night with Vincent and his beautiful fiancé, Marina. Of course we missed all our connections to Brasil, but that is another story.

The Ommastrephid Proboscis

by COA Grant Recipient, Elizabeth K. Shea

The cephalopods are highly specialized marine mollusks. Whereas diversity of living species is not particularly high, many fundamental differences are evident among major groups. The Class Cephalopoda is divided into two extant subclasses: the Nautiloidea, which contains the shelled genus *Nautilus*, and the Coleoidea. The coleoid cephalopods are further divided into the squids, the cuttlefishes, the octopods and the vampyromorphs. Of the over 700 known species, roughly 30%, are cuttlefishes, 40% are squids, and 30% are octopods (Young et al., 1998); only one species of *Vampyromorpha* is currently recognized. Cephalopods are found worldwide, and inhabit all known ecological niches in the marine environment, from the euryhaline squid *Lolliguncula brevis* to the recently described hydrothermal vent octopus *Vulcanoctopus hydrothermalis*.

Figure 1. Photograph of a *Loligo pealei* paralarva (approx. 2mm DML), ventral view. This specimen illustrates some of the common features of newly-hatched squids, including a sac shaped mantle (M), terminal fins (F), anteriorly directed eyes (E) and small arms (A) and tentacles (T). Funnel (FU). All non-ommastrephid squids have separate tentacles at the time of hatching.

Many (but not all!) squids go through their entire life cycle in a single year. Whereas the life cycles of inshore species such as *Loligo pealei* are well known, the details for most oceanic squids are not so clear. We do know that newly-hatched squids, also called paralarvae, are important members of the zooplankton.

As they grow, most species leave the plankton and assume the adult niche which for many oceanic species includes an extensive daily vertical migration. Reproductive maturity develops late in life, often occurring immediately before spawning. Spawning is the culmination of the life cycle, and is so energetically demanding that in many species the adults die soon thereafter. Aside from these broad outlines, species-specific details of life cycle are generally unknown.

My research focuses on the morphology and early life history of squids. Newly-hatched squids, or paralarva (Young and Harman, 1988) of all species have well developed eyes and robust arms and tentacles (Figure 1). They are able to swim from the moment they hatch, and presumably are able to hunt for food immediately, although they have an internal supply of yolk that is sufficient to sustain them for roughly the first week of life. The transition from yolk feeding to raptorial feeding is difficult, and "failure at first feeding" may have a significant effect on species population dynamics (Vecchione, 1987).

The commercially important ommastrephid squids are very abundant in the world's oceans, and therefore must make the transition to raptorial feeding in large numbers. This achievement may be due, in part, to the presence of a proboscis. The proboscis is a transitory structure unique to the family Ommastrephidae. It is formed during embryonic development when the two tentacle buds move towards each other, touch and then fuse (for example see Watanabe et al., 1996).

At the time of hatching, the two tentacles have been growing as a single structure for several hours. Thus, when ommastrephids hatch they have nine appendages arranged around a central mouth: a single proboscis and eight small arms (Figure 2). By the time the organism reaches 6 - 10 mm dorsal mantle length (DML), the proboscis has unfused and two separate tentacles are present (Vecchione, 1979; Roper and Lu, 1979; Wormuth et al., 1992). At this size, the ommastrephids again resemble all other newly hatched squids with two tentacles and eight arms arranged around the central mouth.

Whether the proboscis is used for feeding, how it is used, and what competitive advantage it may impart, are important questions that need to be addressed in the ommastrephids. In order to answer these broad questions, however, we must first understand some of the basic details of this transient

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Figure 2. Scanning electron micrograph of the head and arms of *Ommastrephes bartramii*, ventral view. In contrast to Figure 1, this specimen shows that newly-hatched *O. bartramii* have four pairs of arms and a single proboscis. Arm pairs I-III (a1, a2, a3) are small, but each has at least one sucker (s). Arms IV (a4) are tiny buds which lie against the proboscis (p) and have no suckers. Other abbreviations as in Figure 1.

Ommastrephid Proboscis

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structure, including its morphology, how it changes throughout ontogeny and its contractile properties. To begin to address these details, I have used scanning electron microscopy to examine the external morphology of the developing and separating proboscis in three species of Hawaiian ommastrephids.

Ommastrephids hatch at approximately 1 mm dorsal mantle length (DML, the standard measure of overall size in non-nautiloid cephalopods). At the time of hatching, the two tentacles are fused along their entire length, and the distal tip bears eight suckers. The distal tip can be spread open or drawn closed, and will ultimately become part of the tentacular club in the juvenile and adult stage (Figure 3). The ventral arms are extremely small and lie at the base of the proboscis (Figure 2).

As the ommastrephid gets larger, a split develops at the base of the proboscis (Figure 4) Whether this split arises because the fused tentacles are separating, or because the tentacles have started growing separately from their base is unknown. One of the widely held beliefs regarding the proboscis is that it "unzips" from the base to the distal tip. Measurements of over 100 specimens of *Ommastrephes bartramii* suggest that the size of the proximal split does increase gradually with increasing DML as would be expected if the proboscis was unzipping. Interestingly, as the split gets longer, the total length of the proboscis gets shorter. This result is likely due to contraction of longitudinal muscles in the fused section of the proboscis.

At 6-10 mm DML (depending on the species) the two tentacles that comprise the proboscis are virtually or completely separate (Vecchione, 1979; Roper and Lu, 1979; Harman & Young, 1985; Wormuth et al., 1992). In *O. bartramii*, the only point of fusion that remains is at the base of the club. The fact that several specimens examined were connected at this point suggests that the linkage may be especially strong there.

Once the external morphology and the "life cycle" of the structure is more fully understood, the internal organization of the proboscis musculature must be examined. Preliminary observations have revealed that the two tentacles that comprise the proboscis share a single transverse muscle mass. This means they are indeed fused, not simply encased in a sheath of connective tissue. How this fusion develops, how extensive it is, and how it reorganizes upon separation are questions that remain to be examined. To address these questions, I will look inside the tentacle at the cellular and subcellular organization of muscle cells using transmission electron microscopy. Ultimately, my goal is to be able to distinguish between hypotheses regarding how, or if, the proboscis is used in raptorial feeding by the ommastrephid squids.

Acknowledgements

Many thanks to the members of the Conchologists of America for supporting my research through a COA grant. Thanks also to the captain and crew of the FTS Hokkusei Maru and Dr. Richard Young of the University of Hawaii for allowing me to collect the ommastrephid specimens that are figured in this paper. Finally, thanks to my advisor Dr. Michael Vecchione for introducing me to the wonderful world of paralarval cephalopods.

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Figure 3 (left above). Scanning electron micrograph of the distal tip of the proboscis in *O. bartramii*. There are eight suckers (s) on the distal tip of the proboscis in all ommastrephids. The relative sizes and patterns of the suckers is species specific. Abbreviations as in Figures 1 and 2.

Figure 4 (right above). Scanning electron micrograph of the split developing at the base of the proboscis in *O. bartramii*, ventral view. In the juvenile and adult squid, the tentacles are completely separate. How the tentacles go from fused to separate is unknown, and is the focus of this research. Abbreviations as in Figures 1 and 2. The fourth arms have been removed for clarity.

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Buccinum superangulare: Freak or fact?

by Moshe Erlendur Okon & Dirk Stratmann

In the early sixties a mysterious buccinoid shell began appearing in Stöðvarfjörður, a small fjord in east Iceland. It is not clear how many specimens of this strange shell were found, nor where they are today, but it is clear that there are not many. Two decades later no more of these shells could be found. In 1962 a description of the shell was published in a book on the Icelandic marine gastropods by Ingimar Óskarsson. The shell was given the name *Buccinum superangulare*, probably due to the very upturned, almost stromboid, anal canal. In Icelandic it is called Stöðvarkóngur, meaning "the king" (the term used for Buccinoid shells) of Stöðvar.

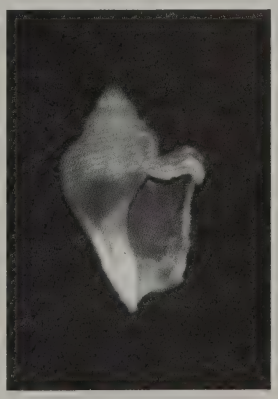
The b&w photograph accompanying the description is of a single 60 x 45mm specimen with the animal and its operculum still inside. The shell is most unusually shaped compared to other Buccinidae, in which the outer lip forms a downward curve from its point of contact with the penultimate whorl. The spire of the depicted shell is heavily encrusted. Part of the description reads: "Aperture rather large — 40mm long and irregularly quadrate or triangular in shape with a rather thin outer lip."

117. mynd. *Stöðvarkóngur* (B. superangulare). (Ljósm. G. Gestsson).

From the original description of *Buccinum superangulare* (Thorson & Óskarsson, 1962).

There is not much reference in later literature, either general or specific to Buccinidae, regarding this newly described species. Golikov (1980) refers to an "aberrant form" from Iceland on a distribution map, but without further comments in the text. Poppe & Goto (Vol. I, 1991) and other books on European seashells don't mention it at all. The CLEMAM database of the Paris Museum (*www.mnhn.fr/base/malaco.html*) does refer to this shell, but lists only the description from 1962 as reference.

Upon hearing of this shell, the senior author attempted to obtain a specimen for photographic and study purposes. Surprisingly, he met with much resistance. One land shell collector, claiming to have specimens of this elusive shell, would not respond to repeated requests to be allowed to see them. A well known naturalist living in Stöðvarfjörður said she wouldn't mind, but she did not know where her one specimen was. The museum of natural history in Reykjavík announced that it is not their policy to assist amateurs, and referred to a non English speaking Danish collector who said his specimen was too small. . . .



Photos by Moshe Okun

***Buccinum superangulare* 23 mm, fresh dead from the intertidal zone, Stöðvarfjörður, E Iceland. (Collection Jón Bogason)**

Most fortunately, however, the senior author met Jón Bogason, a 78-year old malacologist and shell collector living in Kópavogur, a neighbouring town to Reykjavík. Bogason has been working with Swedish malacologist Anders Warén for many years and together they have named well over one hundred and fifty new species. Bogason has recently donated his lifetime collection of over 3000 Icelandic shells and other forms of marine life to his town museum, but he kept the one specimen of *Buccinum superangulare* which he collected himself. Bogason was more than happy to show this specimen and talk of his more than fifty years of collecting.

Bogason's specimen, found in the 1980s, is 23 mm high (protoconch missing) and has a piece broken from the outer lip. Though not live taken, some animal and operculum still remain in it. There are strong spiral ridges on the later whorls, but the earlier whorls resemble those of *Buccinum undatum*, having axial folds as well.

It is important to note that the upturned curving of the anal canal is not consistent throughout the entire shell and is, as far as can be seen, absent from the earlier whorls. This can be observed when viewing the shell from above (directly towards the spire) — the sutural canal formed by the upturned aperture begins only with the last whorl.

It is quite clear that the decision to put this shell on a species level was not based on the biological definition of organisms able to breed among themselves but unable to produce fertile offspring with members of other species, nor was it possible in the 1960s to perform DNA studies of the mollusc. It seems, therefore, that it was the irregular morphology of these shells which led the authors to describe them as a new species.

We believe (as do several others who have seen the shells or their photos) that *B. superangulare* is but a freak of *B. undatum*, which can, perhaps, be given the "status" of a form. There are several reasons for our conclusion, though only DNA tests or careful study of the protoconch can afford decisive proof. The first reason is that, as mentioned above, the upturned curving of the anal canal is not consistent throughout the entire shell and is, as far as can be seen, absent from the earlier whorls. This feature may very well indicate that at a certain point the mollusc changed its growth pattern for some reason.

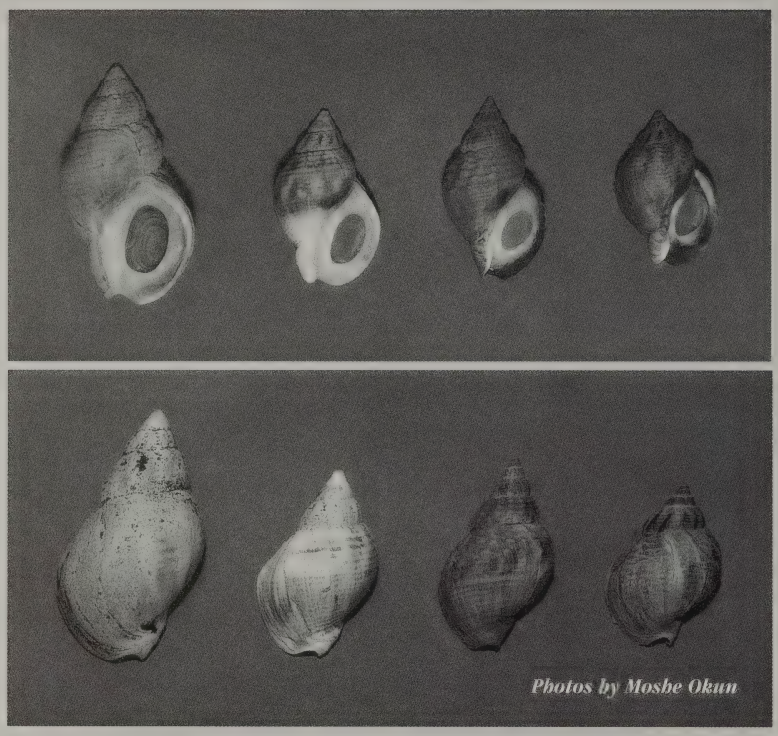
In Iceland, shells from the intertidal zone are also very often damaged due to the rough sea and the rocky shores they inhabit, and show numerous healed breaks and scars. The strange shape of *superangulare* could have been caused by injury to the mantle or to the shell, though we would then expect to find the same kind of freak all around Iceland and in other places in Europe as well, and this is not the case.

Another possibility is that the few specimens of *superangulare* are ecophenotypic variants of undatum caused by environmental conditions. This theory too raises some unanswered questions. First, why then were not

all the undatum shells in Stöðvarfjörður affected? Second, what was the cause of this aberration and why did it suddenly cease to exist? Perhaps it was a parasite which entered the mantle cavity.

The second reason we believe *B. superangulare* to be a freak is that *B. undatum* is a very common shell in Iceland. It can be found all around the island in the intertidal zone and in deeper water where it is also fished for food export. It was found in Stöðvarfjörður at the same time that *superangulare* was, and still can be found there today. The more common a shell is, the more variations and freaks one can expect, and the general appearance of *superangulare* does resemble *undatum* to a certain extent.

B. undatum is also an extremely variable species and many variations and "forms" were described in the past. Óskarsson names six variations present in Iceland and Dautzenberg (1912) pictured many from around Europe, but none of these resemble our mysterious shell. These particular names have no real nomenclatural value as they are only based on external features of the shell. Sinistral specimens are also known, though not from Iceland, and are highly valued as collectors' items.



Buccinum undatum **demonstrating variability, all from the intertidal zone, West Iceland; largest 72 mm. Note the low spire on smallest specimen, 27 mm. (Collection M.E. Okon)**

As can be seen from the photos, those specimens of *B. undatum* found in the intertidal zone are indeed extremely variable. The senior author has also examined hundreds of Icelandic *B. undatum* shells from deeper water, but they were rather consistent in colour and shape. Variability includes size, colour, pattern, thickness of shell, sculpture and other features. Golikov (1980) attributes this variability mainly to water temperature, salinity and diet, to name the most important factors, but there are obviously other factors at work, since one may find several quite different specimens in the same spot.

A large hermit crab, *Eupagurus bernhardus*, makes a home of an empty *B. undatum* shell, which is shown here with a live-collected specimen. (Collection M.E. Okon)

Although the literature mentions several different Buccinidae which can be found in northeast Iceland, only *undatum* is a dweller of the intertidal zone and none of the others are nearly as common, nor do any deviate from the regular buccinoid shape. The Zoology of Iceland (Vol. IV part 60, 1941) by Thorson mentions: *undatum, groenlandicum* (synonym of *cyaneum*), *hydrophanum, finmarchianum, terrae-novae* (synonym of *undatum*), and perhaps *tenue* (synonym of *elatior*). Óskarsson mentiones *totteni* (synonym of *polare*) and *humphreyseanum* as well, and Golikov adds *elatior, ciliatum, polare* and *cyaneum*.

To conclude, though we are quite certain that shells named as *Buccinum superangulare* are all freaks of *B. undatum*, we cannot offer a definite explanation as to why this phenomenon occurred in the place and time it did nor why these shells have disappeared completely. We would need to be given access to other specimens and research conditions in Stöðvarfjörður both in the '60s and today to reach more conclusive answers.

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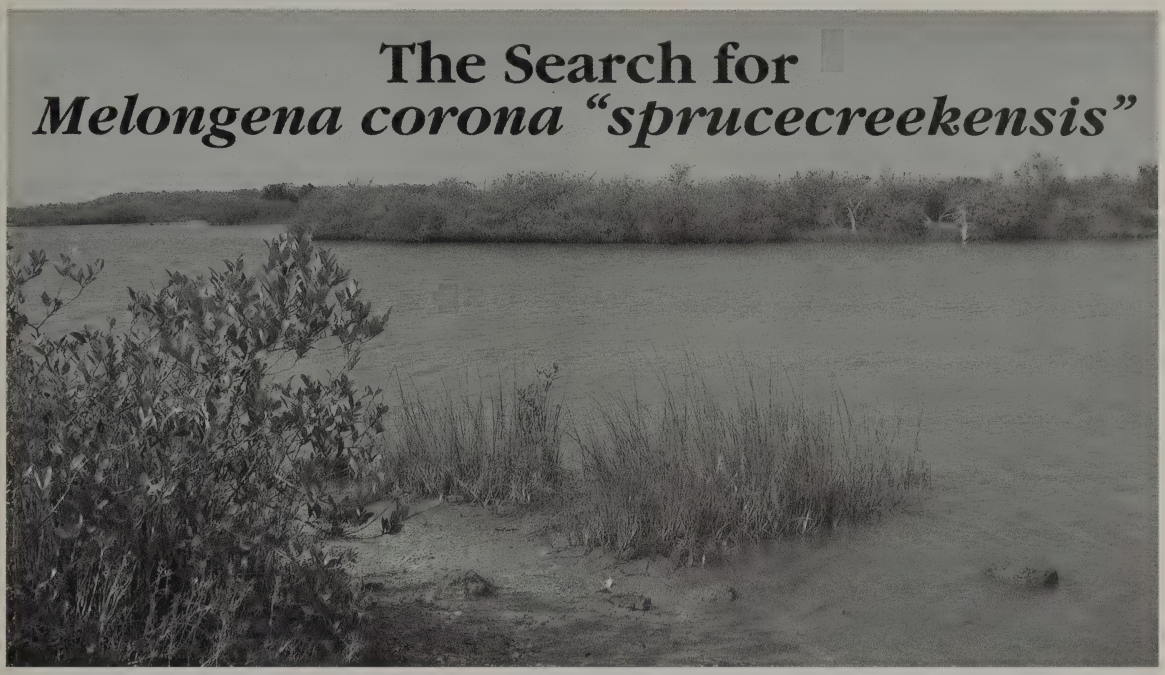
The Search for *Melongena corona "sprucecreekensis"*



Text and photos by Jim Miller

The very first specimens of *Melongena corona* (Gmelin, 1791) that I collected were off the mud flats at Bonita Springs in about 1969. They were all rather small and unimpressive, but naturally, since this was my first discovery of the species, I collected about a dozen. Interestingly, though I had sold, given away or donated all of my original shell collection from the late 1960s through the mid 1970s many years back, my parents discovered a small box of these specimens in their attic when they moved from Miami to Ocala about five years ago. How they got there, separated from all the rest of my collection remains a mystery. However, they were every bit as drab as I had remembered them.

In the last few years, I have found many *M. corona* in various locations in the Florida Panhandle, all of which have been much nicer than those from Bonita Springs. Some are even spectacular. Like many collectors, I have always been impressed at just how diverse populations of this species can be.

When I first met (*American Conchologist* Assistant Editor) Charlotte Lloyd in person a few years back, we were going through her impressive shell collection and came upon several massive specimens of this particular shell. Though they were not particularly attractive representatives of the species, their size alone (about 200 mm) made me wonder exactly where she had gotten them. She told me that about ten years earlier, she happened upon a colony of these shells in the Halifax River just south of Daytona Beach. At this location, she found the huge specimens which were identified as *M. corona "sprucecreekensis,"* as well as smaller specimens that more closely resemble "typica" *M. corona*. She also has several huge specimens that were actually taken at Spruce Creek.

I had a map in the car with me, so I had her show me just where these monster Crown Conchs came from. She pointed out the Halifax River site, as well as two other locations where she had encountered oversized specimens, Rose Bay and the Spruce Creek estuary, the latter being the type location where Tucker had originally collected and named "*sprucecreekensis*" in 1994 (note that he assigned species status to this particular form). With a

— Continued on Page 15

(Above) The Spruce Creek estuary just off US Highway 1 south of Daytona Beach. (Below) Two specimens of *Melongena corona* found on oyster beds in the Halifax River. Note that the shell on the left more closely resembles a "typical" *M. corona*, while the specimen on the right has the tabulated aspect of large "*sprucecreekensis*."

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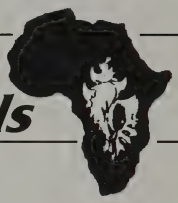

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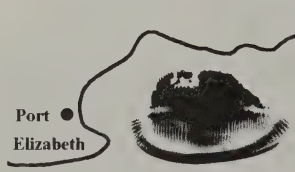

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The search for *sprucecreekensis*

— Continued from Page 13

low tide occurring the following night at around midnight, my wife and I decided to drive down and see if we could find any of these monster *Melongenas*.

We arrived at our motel at about 2 PM, so after checking in, we decided to scout out the areas we'd be exploring later in the dark while there was still plenty of light. The very first spot we hit was the farthest south of the three, Spruce Creek itself. We were dismayed to see that this large estuary had been greatly disturbed by the building of several new bridges and the four-laning of US Highway One. I stood looking out over the murky water and wondered whether any specimens remained in that location. With all the construction, we decided that it would be foolish to even try to look for the shells there that night.

The next spot, Rose Bay, was just as bad. A new bridge was under construction and the four-laning was going on here, as well. I couldn't even find any place where I could actually get down to the water. Things were looking pretty bleak and I felt sure we would be going home empty handed.

Fortunately, the third location was just as Charlotte had described it. I even saw a small *Melongena* feeding on some oysters along the sea wall. This was the location we would check out later that evening.

I am happy to report that we were quite successful on our late night foray. The tide was very low and I was able to explore areas on both sides of the bridge, as well as several oyster beds that were exposed. Not only did I find plenty of large *Melongena corona*, but a number of very attractive smaller specimens, as well. We ended up spending a good two hours at this spot, mostly because finding my way around some of the large rocks and exposed oyster beds was slow work — lose your footing here and you'd end up getting cut up pretty badly by the razor sharp edges of the oyster shells. The largest *Melongena* specimen I eventually brought back with me was just over 6 3/4 inches or about 170 mm. While short of Charlotte's near-record size, these were still hefty representatives of the form from this area and I was quite happy.

I have shared specimens of the large Halifax River *Melongena* with a number of other collectors. Many commented on the fact that they almost appear to be living fossils. One person called them "just plain ugly." I'll let you judge for yourself from the photos.

In subsequent correspondence with *Melongena corona* expert, Phil Poland, he noted that "there is a lot of erosion of the larger specimens in the Halifax River and associated waters (Spruce Creek) and this condition, applied to an elongate specimen, can give it a weird, tabulated (spines gone) appearance." It appears that on this basis alone, Tucker granted the unusual form species status.

I have since visited the area several times, most recently in March of this year (2001). Not surprisingly, given the snail-like speed with which roadwork seems to get done in the Sunshine State, the bridges and four-laning at Spruce Creek and Rose Bay were still not complete as of my visit, though I was able to get to the water in several locations in the Spruce Creek area and collected a few specimens, none of which were particularly large. As for the Halifax River site, there are still as many — or perhaps even more — of the large *Melongenas* present. Again, in correspondence with Phil Poland, I was assured that large specimens of the Spruce Creek form were indeed still to be found in less accessible areas of the large estuary.

Meanwhile, it is unclear to me whether the smaller *Melongena* I found were immature "*sprucecreekensis*" or simply specimens of the common form of *M. corona* (which can be quite variable). Setting them side-by-side with specimens from the Panhandle, I certainly saw differences. In fact, just before this issue went to press I was fortunate enough to locate a number of exceptionally large *Melongena corona* in both St. Joe Bay and in Apalachee Bay near St. Marks in Wakulla County (see photo below).

As to whether "*sprucecreekensis*" is a valid species, my opinion — for what it may be worth — would be that it is not. However, there is no question in my mind that it is a distinctive form that is easy to separate from other specimens from other locations. And so the saga of "*sprucecreekensis*" continues. Meanwhile, whatever you choose to call them, there is no doubt that the Halifax River giants are quite interesting, if not particularly good looking members of this diverse species.

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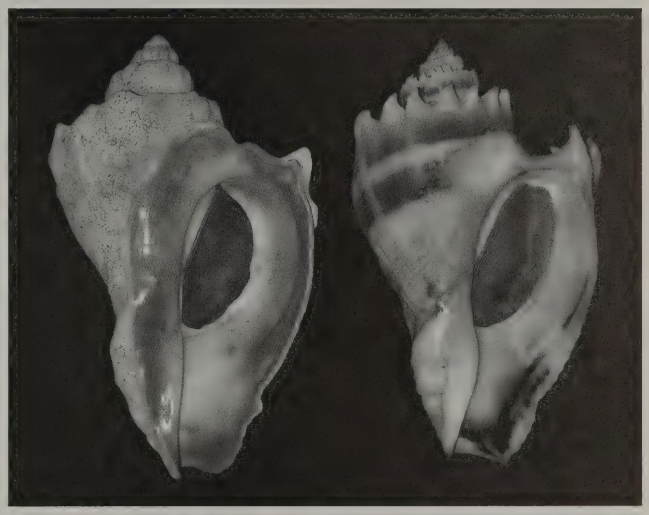
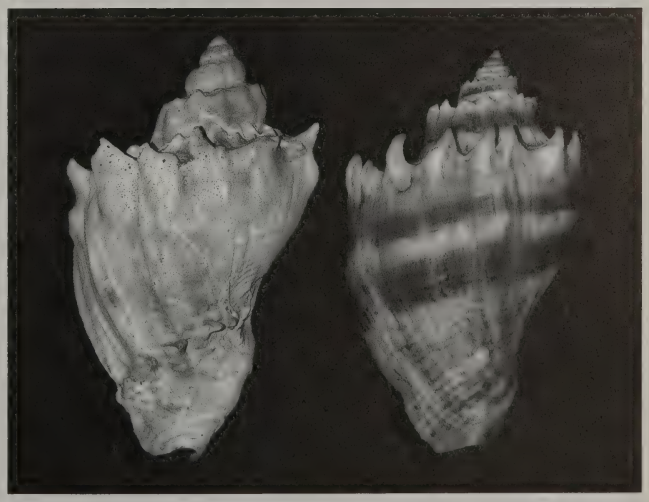




Two views of *Melongena corona* specimens. On the left is a huge 170mm *"sprucecreekensis"* specimen found in the Halifax River in March of 1999, while the more typical-looking (and still quite impressive) 161mm specimen on the right was found on muddy bottom grass flats off St. Marks in September 2001.

Countdown at the Cape: Convention 2001

by Linda Brunner with assistance from Lori Schroeder
Photos by Fay Mucha

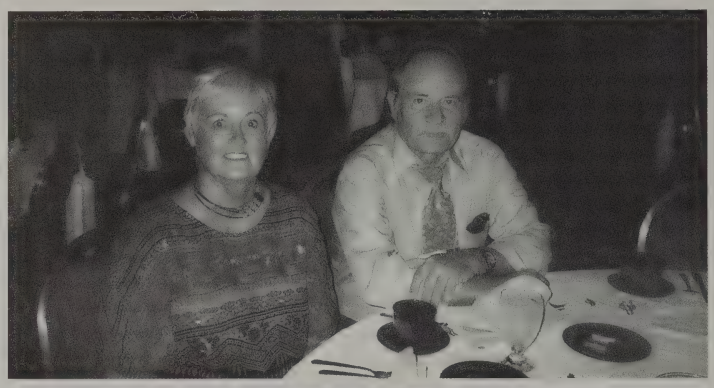
When The Astronaut Trail Shell Club invited COA to blast off on a "2001 Shell Odyssey" we had no idea of the wonders in store. Whether one chose to be a passenger, a part of the crew, or mission control, the voyage was awesome! The week was full of adventure from launch pad to blast off.

The convention center was all abuzz with excited and anxious shellers who'd waited a year for the next few moments. Countdown 10, 9, 8 . . . began with the U.S. Coast Guard and the Presentation of colors, 7, 6, 5 . . . Susan Creighton's heartfelt rendition of the National Anthem heightened our anticipation, 4, 3, 2 . . . and you knew the launch was only moments away as the sound of a conchhorn reverberated throughout the room.

After welcomes from Astronaut Trail Shell Club President Jim Cordy and COA President Betty Lipe, astronaut Alan Gettleman arrived to lead our voyage. He presented gifts to lucky participants and then introduced the land portion of our trip with "Terrestrial Meanderings: Discovering a World of Exotic Landshells" by Richard Goldberg. This was followed by "Endangered Sea Turtles" from Peter and Marlene Schutte, followed by more gifts.

Mission Co-commander Doris Underwood, who was rather quickly and aptly nicknamed "Door Prize Doris," presented almost as many gifts as there are stars in the sky. Along with the gifts there were silent auctions at frequent intervals.

To finish off the first full day we all attended a welcome feast Caribbean style: an epicurean delight, consisting of platters of coconut shrimp, conch fritters, chicken fingers, fruits, cheeses, and succulent meats that would satisfy even the most finicky eaters. The Caribbean bash continued with entertainment by a most unusual group — a steel drum band. So what is so unusual about that? The band members were elementary students who played as skillfully as professionals. After the band departed — their bed time no doubt — Mission Co-commander Bobbi Cordy kept our minds active with a game of "So who wants to be a sheller?" Eat your heart out, Regis!



(Top) Bobbi Cordy, Convention Co-Chair with Husband Jim Cordy, President of the Astronaut Trail Shell Club. *Photo by Doris Underwood.* (Bottom left) Dr. Harry E. Lee receiving the coveted Neptunea Award from COA President Betty Lipe. Emilio Garcia and Lynn Scheu were the other two recipients for 2001. Harry also gave a program, Olivellidae of the Western Atlantic, and served as auctioneer for the convention. (Bottom right) Banquet speaker and noted author Peter Dance bids on a silent auction item, while Les Crnkovic from Texas looks on.

The next day, Sunday, found us beginning our journey through the realm of marine mollusks. Tom Eichhorst led us along the shore to solve "The Mystery of Nerites." Jim Vun Kannon took us to the "Far Out Islands of the Bahamas," and Hank Foglino explained "Water: The Wonderful Stuff Most Mollusks Hang Out In." And this was just the morning.

After lunch it was Dr. Hank Cheney with "Face to Face with Mollusks," and then Dr. Gary Rosenberg presented "The Indo-Pacific on the Internet: How to Catalog 30,000 Species." Next came Ruth Abramson with "From the Beginning and into the New Millennium with Shell Coins and Stamps."

Sunday evening was special for all us "diehards." Workshops offered practical advice from seasoned veterans who ranged across topics from "The Care and Feeding of Shell Stamps, Coins, and Collectibles" to cleaning shells, identifying shells, cataloging shells, exhibiting shells, and photographing shells — there was a workshop for every need. For those who went on the turtle watch later, it was a night under the heavens.

On Monday Wayne Harland took us to "Caribbean Dive Destinations" and Dr. Harry Lee told us about "Olivellidae of the Western Atlantic." In the afternoon, shell show exhibits were set up and judged. The oral auction was a blast with Charlotte Lloyd and Dr. Harry Lee as its two main rocket boosters. A serene cosmic daze settled upon the passengers as the feeling of weightlessness slowly swept over us. COA's educational grants will be well funded

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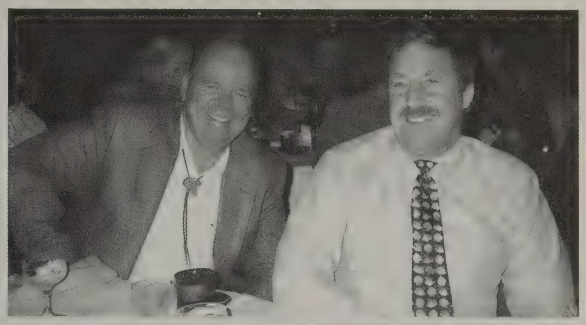
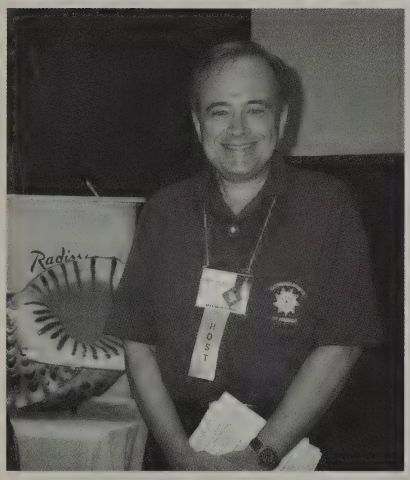
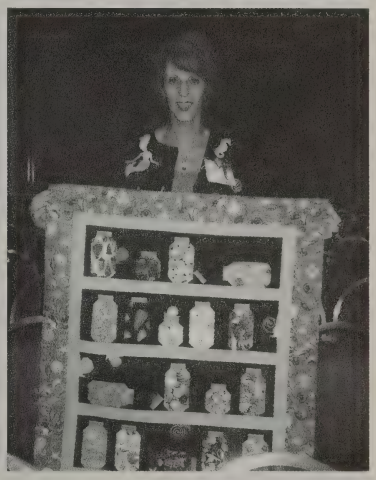
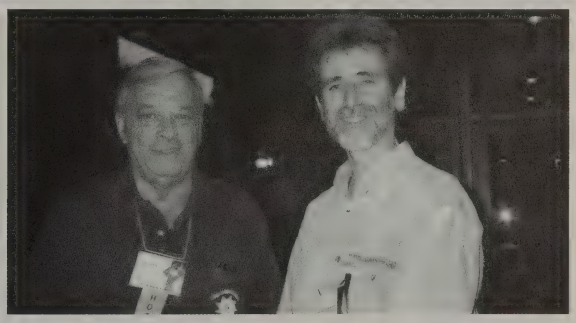
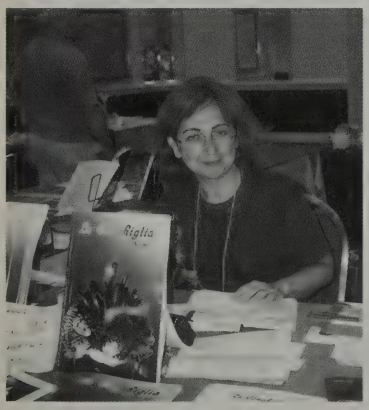










COA 2001: A SHELL ODYSSEY

Top row: **Jose (left) and Marcus Coltro of Femorale in São Paulo, Brazil, enjoy the Banquet. Tom Eichhorst (left) and Bruce Neville, our New Mexico connection. Tom, of course, led the Conch-L meeting.** ***Second Row:*** **Alan Gettleman, Convention Master of Ceremonies. COA Vice President Tom Grace (left) with Emilio Garcia from Lafayette LA. Emilio was another winner of the Neptunea award. Anne Joffe of Sanibel, Florida, shows off the unusual quilt she won in spirited bidding at the Auction. The quilt was created by Linda Koestel. Bonnie Rosenberg, mother of Dr. Gary Rosenberg, also designed and stitched a lovely shell quilt for the COA Auction, as she has in several years past.** ***Third row:*** **COA's Parliamentarian Ruth Anne Sparlin (left) of Houston area, and COA Historian Bobbie Houchin, from Louisville KY. Emilio Power, chair of Programs and Workshops, with well-known shell dealer, Rich Goldberg.** ***Bottom photo:*** **Maria Fontina Angioy from Rome. She is the editor of *La Conchiglia* and Evolver Publishers. She helps produce all those lovely books!**

Countdown at the Cape

— Continued from Page 17

thanks to the generosity and "Spacey bids" of its members.

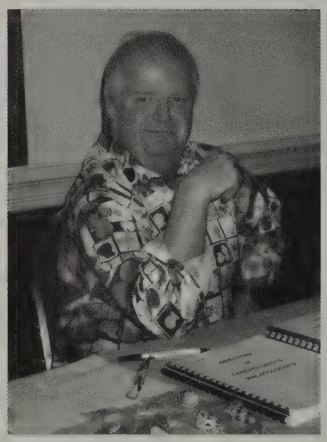
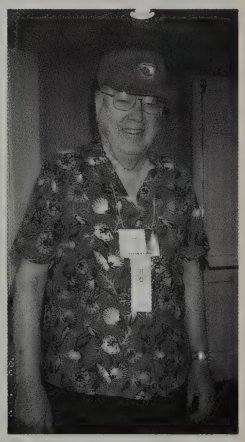
Conch-L participants who were in attendance met in the evening to put faces with names and discuss the workings of the group. Yes, the Question Man was there and he actually did some answering. Some of the other world (outside the USA) members reminded us to be careful of unnecessary messages such as, "Oops," "I'm sorry," and off-topic mail. We were reminded that it costs some foreign members extra to get their e-mail and we should keep some communications as private posts. Maybe we need Mr. Spock to tweak some of our spacey necks.

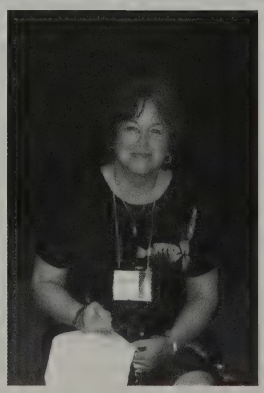
On Tuesday, after the Annual Business Meeting, came the fantastic voyage through the mollusk galaxy called Bourse! With 37 dealers, the event was out of this world! The convention continued with a trip to the Kennedy Space Center, a paddlewheel riverboat luncheon cruise and the banquet where S. Peter Dance spoke of "A Bounty Half Century." Thursday was an actual "Blast" as the shuttle left Cape Kennedy at 5:04 A.M. for its place in space. There is no sound like the one a rocket makes. With that as a wakeup call, the conventioneers loaded their earthbound rockets for home with pleasant memories of the Space Coast.

Mission Control, a.k.a. The Astronaut Shell Club of Brevard provided a convention that was so great it was out of this world — a true 2001 odyssey! A special thank you goes out to Mission Co-commanders Doris Underwood and Bobbi Cordy and their crew. Jim Cordy and the fantastic Silent Auctions, John Baker for the gems he got for the Oral Auction, Phyllis Gray and Laura Pegler for the bid cards that were fit for a launch, neatly tied packets and clear nametags, Emilio Power for managing all the AV equipment, getting all the programs and setting up the workshops so we could find out how little we actually know, Carol Haugh and B. J. Shouppe for the banquet decorations (B. J. was also was in charge of shirts), Astronaut Alan Gettleman for all the free displays, Eleanor Hillman for the field trips (if it has a shell, four legs, and crawls out of the ocean to lay eggs while its privacy is invaded by the peering eyes of two legged creatures, then Eleanor knows all about it), Readie and Dave Cooper for managing the Information Table, John Parkhurst, the everpresent photographer, Linda Koestel for getting us to the correct launch sites with the program booklet, Rachelle Ross for the raffle, and the welcome party and banquet committees. The Astronaut Trail Shell Club is truly a class act. A special thank you goes out to each member of this wonderful crew. You gave us a a *heavenly* week.

If you want to experience your own adventure with shells, start preparing now for the "Greatest Shell Show on Earth" next July 13 - 18 at Sarasota (see Page 3 for additional information).

Below, top row: **Photographer *par-excellence* Fay Mucha with a bigger-than-life Junonia (Did you buy that one, Fay?). A new face at the Bourse: Dr. Nguyen Ngoc Thach, from Viet Nam. Tom Rice from Port Gamble, WA; Tom will chair the 2003 Convention in the Seattle area. John Baker, Auction Chairman.** ***Bottom row:*** **Some of the dynamite convention committee at Registration: (left to right) Sharon Snyder, Phyllis Gray and Mattie Chanley. Charlotte Lloyd, co-auctioneer of a fantastic bid auction. The Kennedy Space Center – some skyline!**



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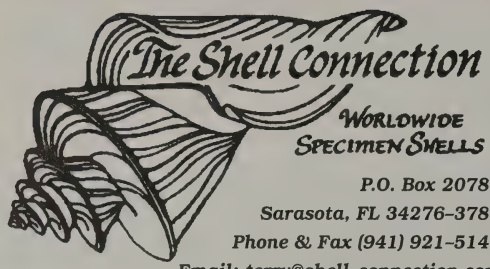

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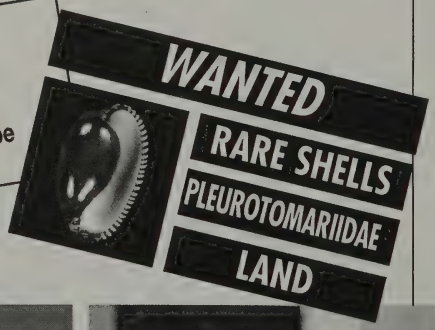

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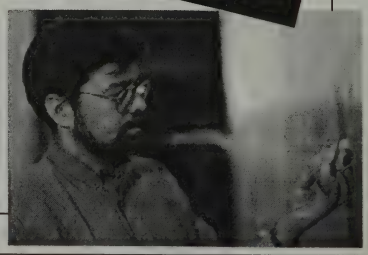

The reward of the day

— *Continued from Page 5*

them is *still* sinistral. Sinistral Florida *Liguus* are extremely rare, as any Florida tree snail aficionado will tell you, and I am stunned by my good fortune. According to published literature, perhaps only one in every 10,000 *Liguus fasciatus* is sinistral, but absolute data is, of course, elusive. Suddenly, the heat and the insects seem distant. This is why I bought the F4. This is why I'm out here. This is, for me, a once in a lifetime opportunity.

My battered Nikon is at the ready. It's tricky, though, because I can't risk touching or repositioning the snails. If bothered, they will quickly retract into their shells for an unbearably long while, maybe not emerging until long after the heat and bugs force me to leave. It's also a little tricky because the snails are in the deep shadows of the hammock. I don't have a flash (it didn't survive the downpour of last month's outing, a day I like to call "Black Thursday"), so lighting, and consequently depth-of-field, are problematic.

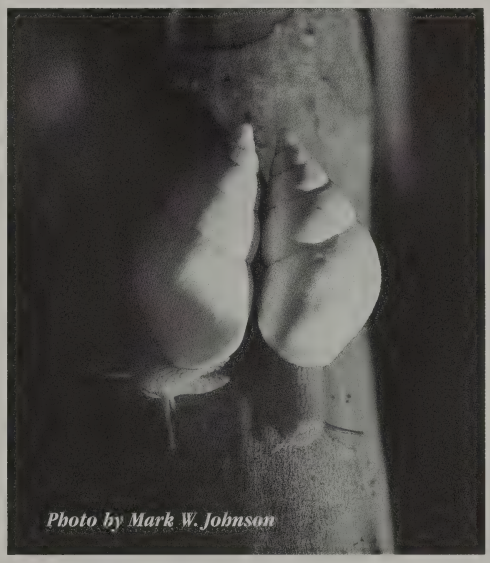

Photo by Mark W. Johnson

I pull from my bag of tricks (a.k.a. my spiderweb-covered backpack) a photographic reflector so as to angle sunlight directly on the snails. Still, I can only manage F 5.6 at 1/60 second, so extreme close up photography is limited due to poor depth-of-field (if the shell is in focus, the animal will be out of focus, and vice-versa). Additionally, the camera will tend to expose the picture based primarily on the bright white shells in the center of the viewfinder, causing the animal and the background to appear darkened in the resulting photograph.

My solution is to shoot the shells from about 20 inches away (my lens is a 60 mm macro), allowing as much light onto the subjects as possible with the reflector. Although the depth-of-field is still a problem, I try to minimize it by focusing on the area where the snail emerges from the shell. I then manually use +2 exposure compensation to lighten the background, and hope that the folks in my hometown film processing shop can handle the rest. With high hopes and an increasing amount of insect repellent running into my eyes, the mosquitoes and I shoot three more rolls of film.

I arrive at my car just as dusk arrives on the Hammock. Physically, I am a beaten man, but I am very content with the accomplishments of the day. I pull a tick off myself and hope that whatever else is on me won't bite me while I'm driving, a potentially disastrous situation for all involved. I head towards a good, come-as-you-are, greasy spoon-type restaurant down the road where nobody glances twice at how bad you might appear. I get looked at twice anyway. Neither the spiders nor I much care.

It's important to note that *all* color forms of *Liguus faciatus* are considered under the mantle of a Species of Special Concern in Florida, and it is illegal to collect either living or dead shells without a permit. Additionally, while many Southern Florida hammocks are quite accessible and open to the public, many natural hammocks of the Florida Keys (and certain other areas) specifically forbid trespassing (some may be accessed only by special permit). As indicated, the hardwood hammocks — especially in the Florida Keys — can be an unforgiving habitat. Be prepared. Be sure to know the laws that apply if you wish to partake in the observation and photograpy of these beautiful and truly fascinating mollusks.

markwilliamsjohnson@hotmail.com

California collecting: Setting the record straight

We've all heard at one time or another that collecting live mollusks in California is illegal. But what exactly is the law? **Paul Kanner**, a COA member from California, posted the following to Conch-L:

"Next time a dive master on a California dive boat tells you that it is illegal to take any mollusks, you can tell him to read the California Sport Fishing Regulations. I am the the second skipper on one of Southern California's dive boats, *The Westerly*. I personally collect and know that it is legal.

"There are restrictions to tide pool collecting. Under the Mollusks section [of the Regulations] the only restricted species are abalone where only *Haliotis rufescens* may be taken by freediving north of San Francisco. Pismo clams may be taken in season and in unprotected areas but only ten and they must be over five inches. Razor clams may be taken, but only 20, with a few beaches restricted, Mussels are allowed where ten pounds is the limit, Rock Scallops with a limit of ten, and Moon Snails with a limit of five. Speckled Bay Scallops (*Argopecten aequisulcatus*) are totally protected and may not be collected live anywhere in the state. With the exception of abalone, these are daily bag limits.

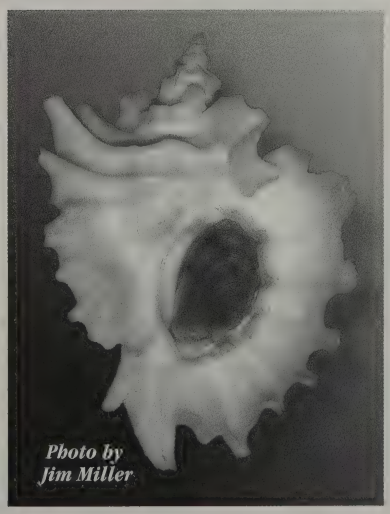

Photo by Jim Miller

"Here in California we have not gone totally eco-crazy yet. Maybe that is because most of our desirable species are rarely found on our beaches, even after a storm. The so-called Sanibel stoop doesn't exist out here. However, please note as an addendum: there are stricter restricions in the Channel Islands National Park, depending on where and how far off the islands you are."

(All of the information here is taken directly from the California Department of Fish and Game Regulations.)

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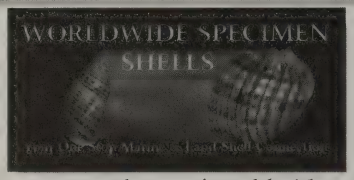

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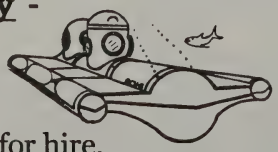

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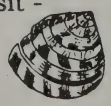

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The ancient Maya and their modern land snails

by Neil E. Faby

People travel for various reasons. Some, like me, don't cook, so we have to travel. The purpose of this trip was to visit some Classic Period (600-900 A.D.) Mayan sites in the province of Chiapas in Mexico and Peten Department in Guatemala, and also to collect any land snails I happened to meet.

Thursday, March 16, 2000. We flew from Mexico City to Villa Hermosa near the Gulf of Mexico. This city of 250,000 spreads over the oxbows of a meandering river. Rachael, the co-owner of Ceiba Travel, met us at Villahermosa. Over the phone I had asked her husband how I would recognize her. He said, she'll be easy to spot. She will be the only American and will be wearing shorts. He was correct. The couple work in Guatemala in the winter and guide river trips on the Colorado during the summer. We drove about an hour and a half to Palenque where we stayed at the Xibalba Hotel, a bad name for a hotel, as it means "Place of Fright." The accommodations were excellent and I found the freshwater *Pachychilus indiorum* on the hotel grounds.

Saturday, March 18. After breakfast at 7 AM, we drove about 40 minutes to the Palenque Ruins at the junction of the Yucatan plain and the highlands. Numerous impressive structures survive at this site, including the Temple of Inscriptions, above the crypt of an ancient Maya ruler, the multilevel Palace, and the Temple of the Count. Much more impressive than Chichen Itza, these ruins are close together against a wooded hill. We visited the ruins at a leisurely pace. Joe, our Mayanist, explained drawings of the murals as we stood in front of the original. His explanation of their lives, social structure, and glyph reading brought the ancient Maya to life. The Temple of Inscriptions with its burial chamber was closed but we saw a replica of the sarcophagus lid in Palenque across the road from the hotel. Von Daniken in *Chariots of the Gods* claimed the reclining figure on the sarcophagus is a spaceman. It didn't look like a spaceman to me. Past the Mayan aqueduct at the visitor center we had a picnic lunch. Here, abundant shells of *Pachychilus indiorum* resembled those described by Morelet when he named it in 1849. Half buried in the wash on slopes and on the level ground were also *Helicina amoena* and *Helicina sp*.

***Euglandina cumingi* found in Seibal (46.8 mm)**

Saturday and Sunday, March 18-19. A 1.5 hour drive took us to Frontera Corozal on Rio Usumacinta (the Mexico-Guatemala boundary). Dining on the porch of our restaurant, we heard the croaking of the giant frogs in the river. On an after-dinner walk around the hotel grounds, under scattered trees, I found a well preserved empty shell of the carnivore *Euglandina cumingi*. A smooth canoe ride down the Rio Usumacincta brought us to the Mayan site of Yaxchilan. The partially excavated ruins are on a great meander in the river. Within the jungle cover are numerous beautifully carved lintels (a wooden beam supporting the wall above a doorway) and stelae (vertical free-standing stone monuments erected for special occasions). The Lacandon people of the rain forest come to Temple 33, the site's principal structure, to pay homage with lighted candles to their deity, Hachakyum. We found recent candle stains.

At the ruins we left our canoe, driver, and lunch, and walked into the site. Dead snails were abundant in the open, second-growth forest. To avoid the congestion of the few other groups, we walked to the highest structures first. The roaring-lion call of the Howler Monkeys lasted for an hour. Scary enough during the day, it would be frightening to hear in the middle of the night.

After lunch at the canoes, we returned to the Main Plaza via the Labyrinth, a below-ground series of connecting chambers (we used flashlights) which lead to the west end of the Main Plaza. In the Labyrinth were six inch long Tail-less Whip Scorpions I didn't want to disturb under any circumstances. I was later told that if a movement is made toward them, they will quickly vanish. If they moved, I also quickly would have vanished.

Many empty shells on the ground beneath the second growth forest included *Pachychilus indiorum, Neocyclotus dysoni ssp, Helicina amoena, H. flavida, H. tenuis, Euglandina cumingi, Drymaeus sulphurus, Bulimulus unicolor, Polygyra yucatenea helictomphala, Chondropoma radiosum, C. rubicundum,* and *Salasiella margaritacea*.

Monday, March 20. In the morning we drove about 100 miles to Bonampak, or "Painted Walls." Recent discoveries at Bonampak and Dos Pilas have drastically altered the view that the Maya were peaceful peoples cultivating their crops and celebrating religious and social holidays at the great religious centers. The tranquil scene has been replaced by one of warfare and hostility. The Mayan world's finest surviving polychrome frescoes, here at this site, depict war, sacrifice, and celebration. The three chambers of Structure 1 give a view of everyday life, social and human characteristics, vestments, dances, musical instruments, textile arts, political ceremonies, and war customs.

Room 1 features a scene of preparation for a raid on a nearby village. A realistic depiction of the action, the manners, the social classes, the dress, and the ceremonial regalia of the eighth-century Maya, its lower section includes musicians and masked figures in a procession. In Room 2 the story continues with a battle scene of the actual raid, and a "judgment scene," depicting the prisoners being arraigned before the great lords of Bonampak. Room 3 shows the sacrifice of one prisoner and the others pleading for mercy. Next, a celebration and dance show the nobles and dancers in their richest ceremonial garments. It has been said the murals surviving at Bonampak rank with the great artistic masterpieces of all time. I found a few operculates on the slope above the upper structures.

A flight to Flores in Guatemala showed us the rivers of the area, with many meanders as they flow from the highlands and spread over the flat limestone platform of Yucatan. The island city of Flores, in Lake Peten Itza, is connected to the mainland by a causeway. It was at Flores (then called Tayasal) that the Maya of this region were finally subdued in a battle with the Spaniards in 1697.

A van and driver drove us from Flores to Tikal, an hour away on an elevated plateau in a dry forest. Our hotel, the Jaguar Inn, had no electricity because they ran out of fuel for the generator. We ate dinner at the Tikal Inn which had electricity. I also had a bug problem during the night but solved it by putting a shirt over my head. The mosquitoes had been called by Stephens in 1839 the "murderers of rest."

Tuesday, March 21. One of the largest and most powerful Mayan cities, Tikal dominated the Maya world throughout much of the Classic Period. Excavated and reconstructed by the University of Pennsylvania (1956-1971), the ruins are concentrated at the center of the Tikal National Park, a preserve of

Ancient Maya and modern land snails

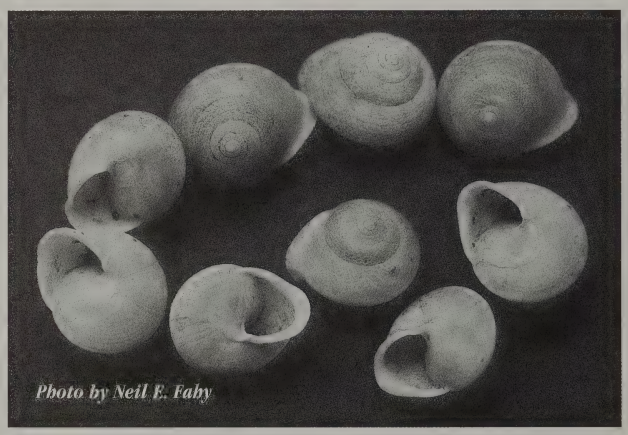
— *Continued from Page 23*

222 square miles, 4.5 times the city of San Francisco. Crowning features of Tikal, the five great pyramids give a unique, majestic grandeur to this ceremonial center. The height of the temples, crowned with tremendous roof combs; the complicated assemblage of the palace structures of the Central Acropolis; and the complexity of the chronology of the North Acropolis are staggering to anyone first visiting Tikal. Temple IV, one of the two highest pyramids in the New World, is 229 feet high! As you approach the Great Plaza, everything is of monumental scale. At the end of the plaza Temples I and II face each other. On the south are the palace buildings and the North Acropolis, dominating the whole scene

We were up this morning at 5:30 AM and walked to the Great Plaza to bird watch. The others climbed Temple II with its many 18 inch high steps. The high steps are too difficult for an old man so I snailed and did fairly well: *Averellia coactiliata, Bulimulus unicolor, Helicina amoena, H. rostrata, Drymaeus sulphurus, Euglandina cumingi,* and *Orthalicus princeps*. I took some mystic pictures of the temples as they vanished and reappeared in the morning fog.

After breakfast at the hotel, we walked through the ruins to Temple IV, the greatest of the Tikal religious buildings. Since the ladder steps up its 212 feet were of normal height, I climbed to the top. Before us, penetrating through the blanket of forest were Temples I and II, and to the right of them, the imposing summit of Temple III. What a magnificent panorama of the area with three temples projecting through the trees! It was from here that scenes of *Star Wars* were filmed.

While picnicking at the bottom of the ladders near the base of the temple, I began to imagine what the area before us was like 1,200 years ago. The weather would have been cooler than today because it was nearer to the glacier advances of 15,000 years ago. The ground surface would have been treeless and covered with plaster, producing an open sunlit expanse surrounded by great pyramidal temples. In place of the tourists were the Mayan artisans going about their tasks, supervisors directing ongoing construction, the king and his court sitting in the shade of their palaces. What a far cry from today!



***Helicina amoena* from the Yaxchilan area (15.4 mm)**

We walked through the Plaza of the Seven Temples and then back to Temple III and into the Great Plaza where we had been this morning. We visited the North Acropolis and saw the huge rain-god masks on the wall of a former temple, but now inside the two temples subsequently built over this wall. The Tikal complex area was probably cleared of trees during the Classic Period. Reforestation has taken place over the last 1300 years. We returned to the Jaguar Inn, again with no electricity, but we did have bugs.

Wednesday, March 22. After driving two hours from Tikal we arrived at Sayaxche and took a canoe ride up the Pasion River to visit El Seibal National Park. There is no major reconstruction, but the stelae are among the finest and best preserved Late Classic sculptures. The forest is more moist and there were snails everywhere on the ground, but nothing alive. The ruins are older than Tikal and have non-Mayan faces and many stelae. The snails were *Averellia coactiliata, Beckianum beckianum, Euglandina cumingi, Helicina amoena, Helicina sp., Neocyclotus dysoni aureum,* and *Orthalicus princeps*.

We left Seibal by canoe, passed Sayaxche, and took a left up Rio Pelexbatum to Pasada Caribe Lodge. There was a very shallow area of river just after leaving Sayaxche. The canoe men had to wade and push the canoe. After arriving at Pasada Caribe at 5:30, we had electricity! Our tour group was joined by two young members of the Guatemala Federal Police who had been requested by the tour operator for security. They are civil police and can be requested (like the U.S. Coast Guard) without a fee. The operator supplies housing and food for the police. The federal police were organized four years ago and now numbers 20,000. In the year 2004 they hope to number 40,000.

Thursday, March 23. Our canoe left at 8:00 and continued an hour up the Petexbatum River to Lake Petexbatum. After crossing the lake, we entered a small channel and proceeded to the edge of a wooded escarpment. The Aguateca research camp is here but it was not then occupied. About a hundred yards back from the escarpment is a great cleft about ten feet wide and a hundred feet deep. We walked into it and climbed out at the assembly field. The cleft was used in Mayan days as a dry moat.

In the dry forest I collected *Averellia coactiliata, Beckianum beckianum, Bulimulus unicolor, Chondropoma rubicundum, Euglandina cumingi, Helicina amoena, Helicina tenuis, Neocyclotus dysoni aureum,* and *Orthalicus princeps*. Along the river *Pomacea flagellata* was abundant.

About two and a half miles on Lake Petexbatum from Aquateca is the peninsular site of Punta de Chimino. Across the narrow neck of the small peninsula, three dry moats were dug sometime in the 8th Century. One moat is 460 feet long and required the removal of some 50,000 cubic yards of earth and rock. Also on the site itself, a walled wharf protected the canoe landing. Even the farming areas in the vicinity were enclosed with walls. This site was abandoned sometime in the 8th Century. Here I found *Euglandina cumingi, Helicina tenuis,* and *Neocyclotus dysoni aureum*.

Friday, March 24. We left Pasada Caribe about 8:00 by canoe to Paso Caribe. We had the option to ride a horse or hike to the ruins at Dos Pilos. We all hiked. We left our gear for the horses to carry and started our six-mile hike to Dos Pilas. The first mile or so was across level fields and disturbed areas. At the park was a cleared boundary lane with a less disturbed forest inside. At Arroyo de Piedra we registered at the park headquarters. Our policemen were in plain clothes so they would not antagonize tree poachers who are logging the park. We heard the chain saws day and night.

A magnificent Ceiba tree near Arroyo de Piedra has a buttress 35-40 feet in diameter. We continued hiking through the dry forest gaining elevation as we went. On the trail near Arroyo de Piedra I found many shells, including several of the two-inch decollate urocoptid *Eucaladium mexicanum*. At Agunde we stopped and looked at stelae which were carved in bolder relief than any we had seen elsewhere. The carvings were at least an inch deep, in many cases two!

The trail is well maintained but we crossed logging roads along the way. Dos Pilas is a large site and the former research camp buildings of Vanderbilt University are now used by the park workers. The name means "two springs," only one of which is perennial. Many of the stelae and hieroglyphic stairs have been diamond sawn and had sections removed and sold, some as late as 1997. The park guards are helpless to stop the heavily armed looters. Fortunately, the glyphs had been photographed and copied so their stories still can be told.

There is a beautiful spring bubbling from the limestone. We filtered the spring water for drinking. In the spring were shells of *Pachychilus indiorum*. Near the spring I found a live *Orthalicus princeps* aestivating on the smooth tree buttress about six feet above the ground. There also was a live *Helicina*

amoena on a shrub leaf about two feet high. Dead shells were abundant, including cyclophorids and annularids.

During our camping everyone had a two-man tent and slept on an air pad in a sheet slip (a sheet folded in half and stitched part way up one side). We also had a Kelty sleeping bag. About 1:00 AM I opened the sleeping bag and used it over the sheet as a blanket. Thankfully, there were no bugs! We had a large, very well maintained two-seat pit toilet with two separate entrances but no partition between the seats! The species found were *Averellia coactiliata, Chondropoma rubicundum, Drymaeus sulphurus, Eucalodium mexicanum, Euglandina cumingi, Helicina amoena, H. tenuis, H. sp., Neocyclotus dysoni aureum, Orthalicus princeps,* and *Pachychilus indiorum*.

Saturday, March 25. After breakfast we gathered all of our gear and the horsemen packed the animals. We returned by our prior route to avoid the wood cutters. Near Agunde we visited Agunde Cave. The Maya believed it was an entrance to the Underworld. It is a dry cave with a collapsed vertical entrance to a series of chambers about 30-50 feet below the ground level. Unfortunately, I didn't find any cave snails.

After passing Arroyo de Piedra we took a shadier trail back to the canoe. The trail was through very nice forest but it was quite steep in spots — okay, going down wasn't so bad, but it would be tough going up. On the river at Paso Caribe, we waited a few minutes for our canoe to return after they brought the horse-carried gear to the lodge.

After lunch, I took a nap, then at 5:00 we walked through Julien Marinos' Forest, a regrown area that was cut 16 years ago. The trees along the nature trail were numbered and named. Our guide told us about the plants and how there were used. I collected *Euglandina cumingi* and *Helicina amoena*.

Sunday, March 26. We left at 7:30 on our 60-foot canoe for Sayaxche and then down the Rio Usumacinta. It was cool on the river with an eerie fog rising in swirls from the water. Sayaxche is the largest city in the region. Two or three buildings stand on one side of the river, and the city is on the other. A flat ferry and canoes effected the crossing. It was Sunday and the town was busy. Shops were open and vendors were abundant. In one booth were several women selling cooked food. This must be the local equivalent of "fast food." I also visited a hardware store. The machetes are made in El Salvador and the barbed wire is made in Guatemala. It is a common practice for the local people to hang their wet clothes on the barbed wire fences to dry. This works well until it gets very windy and tears the clothes.

Jesus, our guide, left us in Sayaxche but the two Sayaxche-based policemen stayed. Sayaxche has a stele, found at La Aliamia, that depicts a mighty ruler of Late Classic times. His unusual headdress, ear pendant, necklace, and leg bands are interesting adornments. He is dancing with one foot off the ground on a jaguar pedestal.

Going down river we stopped at the Altar of Sacrifice. The hieroglyphics were carved in sandstone which erodes more easily, so they were difficult to read. At previous sites when we left the canoe and climbed the bluff to the ruins, the slope was strewn with empty cyclophorid shells. The other Mayan sites had been in limestone but this was sandstone and the bluffs were devoid of shells. Although cyclophorids were absent, tree snails were present. Along the beach below the site were many potsherds, recognizable as Mayan by their color and patterns. I also found the freshwater clam, *Psorula percompressa*.

Top photo: *Orthalicus princeps* aestivating on a tree trunk at Dos Pilos (28.9 mm). Bottom photo: *Helicina amoena* atop a leaf, also at Dos Pilos (12.5 mm).

We camped for the night at an island near the Boca Lacantun. It had a sand-gravel beach with a few trees on the down-stream end of the island. I set up my tent and then walked across the island in the tree area but found no snails. The island is probably under water during the wet season but there were plenty of freshwater clams, *Psorula compressa* and a *Uniomerus* on the beach.

Monday, March 27. This morning we broke camp and continued down river. At the small village of Bethel we cleared Guatemala immigration. Along the vegetated cliff above the river I collected *Beckianum beckianum, Helicina tenuis, Helicina sp., Neocyclotus dysoni ssp., Pachychilus indiorum,* and *Polygyra yucatenea helictomphala*. The area down stream from Bethel is limestone and we went through a narrow limestone gorge.

The Shells. In terms of number of species and number of specimens, this trip was the most successful collecting I'd had in Central America. My collecting in Coastal Mexico and Costa Rica had been poor. Excluding bivalves I found 6 Helicinidae, 4 Poteriidae, 3 Orthalicidae, 2 Spiraxidae, and 1 Ampullariidae, Helminthoglyptidae, Pleuroceridae, Polygyridae, and Urocoptidae.

The land operculates were the most dominant in number of species and specimens. If it had been the wet season, the percentages might have been different. Only four specimens were collected live. The rest were part of the accumulated death assemblage.

Evaluation. It was a different kind of trip for me. First, there were only four of us. Second, we were going to remote areas. We traveled by plane, van, canoe, and on foot. We camped two nights, the first in Dos Pilas after a 6-8 mile hike. Fortunately, horses hauled our camping equipment and food. The second night we spent near Boca Lacantun on the shore of the Usumacinta River. In both cases all our needs were adequately met. At Boca Lacantun we had a portable toilet which was placed beyond sight of the camping area. The tents and sleeping were excellent as were the "home-cooked" meals.

What did I learn? I learned that reconstructing the ancient Maya civilization from its archeological structures is like reconstructing United States history just from looking at all the monuments in Washington, D.C.

Liguus fasciatus (Muller, 1774)

By Kevan and Linda Sunderland, 9370 N.W. 39th Street, Sunrise, FL 33351, E-mail: *klshells@mindspring.com*

Liguus fasciatus alternatus
(Simpson, 1920) 50 mm

Liguus fasciatus barbouri
(Clench, 1929) "Blue form" 54 mm

Liguus fasciatus castaneozonatus
(Pilsbry, 1912) 59 mm

Liguus fasciatus clenchi
(Frampton, 1932) 47 mm

Liguus fasciatus elegans
(Simpson, 1920) 52 mm

Liguus fasciatus floridanus
(Clench, 1929) 53 mm

Liguus fasciatus fuscoflammellus
(Frampton, 1932) 44 mm

Liguus fasciatus gloriasylvaticus
(Doe, 1937) 60 mm

Liguus fasciatus graphicus
(Pilsbry, 1912) 57 mm

Liguus fasciatus humesi
(Jones, 1979) 54 mm

Liguus fasciatus lignumvitae
(Pilsbry, 1912) 53 mm

Liguus fasciatus lossmanicus
(Pilsbry, 1912) 54 mm

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Close, H. T. 2000. *The Liguus Tree Snails of South Florida.* The University of Florida Press, Gainesville, Florida

# of South Florida — Part One

The intent of this feature is not necessarily to distinguish valid or invalid species, but to provide illustrations of taxa not always popularly available, for the information of the collector

Liguus fasciatus marmoratus
(Pilsbry, 1912) 59 mm

Liguus fasciatus matecumbensis
(Pilsbry, 1912) 51 mm

Liguus fasciatus miamiensis
(Simpson, 1920) 50 mm

Liguus fasciatus mosieri
(Simpson, 1920) 63 mm

Liguus fasciatus ornatus
(Simpson, 1920) 50 mm

Liguus fasciatus pseudopictus
(Simpson, 1920) 57 mm

Liguus fasciatus roseatus
(Pilsbry, 1912) 53 mm

Liguus fasciatus simpsoni
(Pilsbry, 1921) 69 mm

Liguus fasciatus solisoccasus
(deBoe, 1933) 56 mm

Liguus fasciatus testudineus
(Pilsbry, 1912) 55 mm

Liguus fasciatus versicolor
(Simpson, 1920) 50 mm

Liguus fasciatus wintei
(Humes, 1954) 64 mm

Pilsbry, H. A. 1946. *Land Mollusca of North America (North of Mexico) Vol. II, Part 1.* The Academy of Natural Sciences of Philadelphia, Monographs, Number 3,
Platt, R., 1949. Shells Take You over World Horizons, *National Geographic Magazine, V.127,* No.3, March 1965, pp 76-82

From the art of the scientific paper to paper arts by a scientist

by Richard L. Alexander

Papermaker and artist **Michael G. Lafosse** credits his annual family trips to the Cape Cod beaches as the beginning of a lifetime of fascination with sea shells. Michael still enjoys shells, but rather than collecting them, he now makes his own from handmade paper.

Throughout his high school years in Fitchburg, Massachusetts (once known as a papermaking town), Michael's ambition was to become a professional malacologist. Encouraged by mentors, Dr. William J. Clench, Dr. Ruth D. Turner, and Professor George Buckley at Harvard University, Michael won top honors at an MIT science fair for his invention of a functional underwater holographic camera, which he used to measure growth rates of living marine snails. Michael entered college to further his studies.

Somewhere along that track, things took a twist. Michael, marveling at the beauty of the shells' forms and variations, succumbed to the art of the shell. Though natural studies remained at the core of his interests he went on to producing art on full-time basis. For Michael, paper held the promise for simulating the thin, translucence of nature's most delicate shells. He began to evaluate many types of paper pulps and hand papermaking techniques. Now, a papermaker and sculptor with over twenty years experience, Michael has developed an arsenal of specialized materials and methods to produce his sculptures. He uses fade-resistant pigments and archival quality materials for their long-lasting properties. His seashell creations are built layer by layer, including colors and patterns, giving his shell sculptures a quality of having grown, rather than having been cast in a mould. The rich surface textures and the beauty of fine, handmade paper is evident.

What started as a technique for understanding the morphology of shells evolved into an obsession to re-create their evocative beauty in paper. Michael's paper sculptures, most of which are of a natural history theme, have been exhibited in galleries and museums around the world, including the Louvre. LaFosse has written twelve books on paper art and craft, and he has produced a series of paper folding lessons on videotape.

Michael works at his downtown, Haverhill, MA, workshop, Origamido Studio. Michael's website, *www.origamido.com*, hosts the Boston Malacological Club's web page. Michael has been a member of the Club since 1972, and has recently been its President.

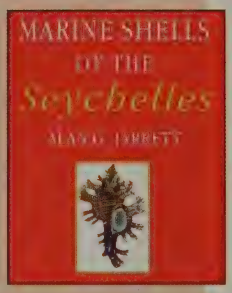
Michael LaFosse holding the wax sculpture for "Strombus gallus III", which he carved prior to making the final paper model. Photo Credit: *Richard L. Alexander*.

BOOK REVIEW

Marine Shells of the Seychelles by Alan G. Jarrett. 2000. 149 (+ xv) pp. About 650 color illustrations and numerous line drawings of species and special features. 9.5" x 12.25". Hard cover Perfect Binding. ISBN 1 903479 00 2. $67.50 U.S.

Alan G. Jarrett, a zoologist working in the Seychelles as a teacher for the past 10 years, has produced a work that is a must for any collector of Indian Ocean seashells: **The Marine Shells of the Seychelles**. This privately-published, lavishly illustrated, large format book is an impressive undertaking! It treats nearly 500 species of gastropods and bivalves from the waters of the approximately 100 islands of the Seychelles. Small wonder that the species are plentiful; these islands, scantily explored malacologically, are spread over an area or more than 400,000 square miles in the tropical western Indian Ocean. The islands comprise two main groups, one coralline and the other granitic. The author collected most of the species personally; most come from the granitic group, about 600 miles northeast of Madagascar.

The coralline group, known as the Amirantes Islands, lies west of the granitic islands, toward the coast of Africa. More information about the coralline island fauna hopefully will be forthcoming; as Jarrett says, "A number of species have been reported in the literature which I have not been able to confirm…." and he goes on to speculate that these may have been collected in the Amirantes. (A map of the area would be helpful in a future edition of this book.) He does include mention of these species of unknown location, but does not picture or describe them.



Regarding the taxonomic treatment, "The author is aware that Molluscan taxonomy has moved on since the structure of the book was established but has decided not to change it, recognising that any revision would soon become outdated as our understanding of the relationships between the groups continues to develop."

An introductory section covering collecting methods, aquaria, cleaning, and record keeping is augmented by a Family and Species table of contents in taxonomic order and a glossary. A second glossary and helpful photo illustration of salient bivalve features opens the Bivalvia section of the book. There follows the systematic treatment. A species index concludes the work. Each species is pictured in photos by S.K. Sewell or Dr. Jarrett. For the most part they are clear, readily identifiable specimens, shown in several views. Size, sculpture, color, pattern, and habitat notes are augmented by the author's comments on many species. No well-equipped collector will be without this attractive and informative book.

TUSK SHELLS: An unusual and unique class of mollusks

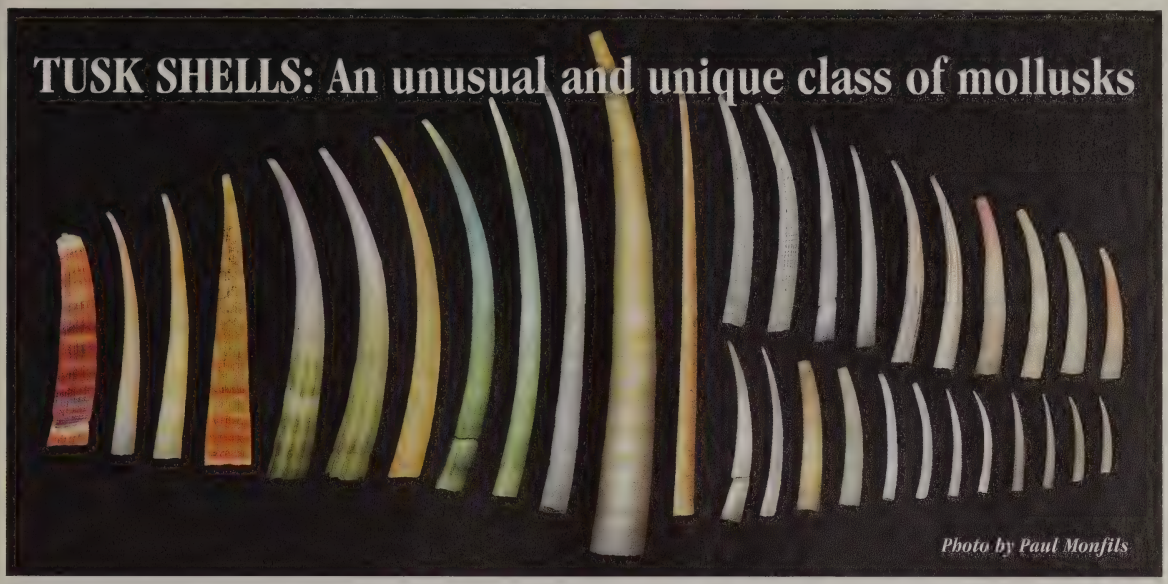


Photo by Paul Monfils

THE OLD SHELL GAME

by Paul Monfils

When early French explorers reached the northwestern regions of what was to become the United States of America, they found a diverse culture of native peoples living largely along the banks of major rivers and their principle tributaries, and on the shores of sheltered Pacific bays. Their food was largely of aquatic origin – salmon and shellfish – and so was their money. The form of currency most widely employed in both local and intertribal transactions consisted of the smooth, cylindrical shells of a local marine mollusk.

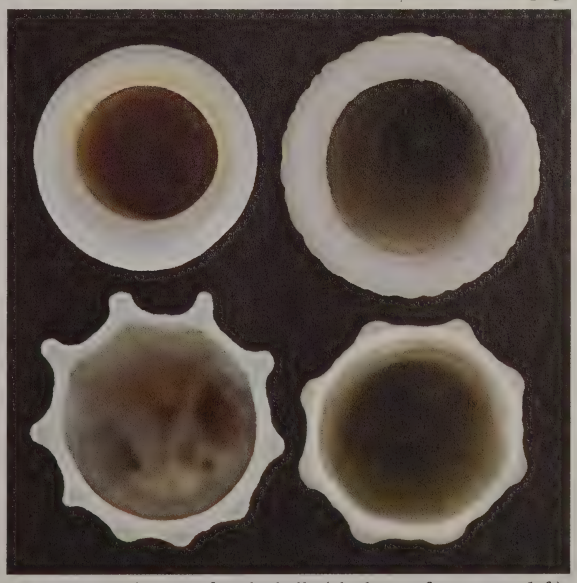
Sturdy and tubular in shape, and open at both ends, they could easily be threaded onto strands of sinew or fine rawhide, like natural beads. Strings of five, ten, twenty, fifty, and other specific counts were utilized, not unlike the various denominations of modern metal and paper money. Standard values were assigned to specific commodities – a dog, a canoe, a horse . . . or a wife. The small, inconspicuous creatures that provided this exchange medium were not bivalves (like the clams which furnished the wampum beads of eastern tribes) nor gastropods (like the money cowries which served as currency among the South Sea Islanders). Rather, they were members of a small but distinctive class of mollusks known taxonomically as Scaphopoda – and colloquially as tusk shells or tooth shells.

The specific species used was *Dentalium pretiosum*, still known to conchologists by the common name "money tusk." It is not entirely clear how tribal members managed to collect so many shells of a species that typically inhabits moderately deep water. Off Vancouver Island in Western Canada the species is found in somewhat shallower habitat. There the Nootka used long poles with bundles of small sticks lashed to the end, to probe the bottom, capturing the occasional tusk shell that became wedged among the twigs. Additional poles were lashed together to allow tusk fishing in deeper water. The considerable amount of time and labor involved, and the inevitably small return was, of course, the basis for the value ascribed to the shells.

Tusk shells served as currency well into the 19th century, at which time enterprising Europeans, recognizing their value in barter, imported vast numbers of common, similar-appearing European tusk shells (*Dentalium vulgaris* and *D. entalis*). The inevitable effect – scaphopod inflation – quickly ensued. The pecuniary value of tusks plummeted, and the natives abandoned them in favor of other items of trade. Still, the former role of this little animal in early American culture is forever recorded in its scientific name – "pretiosum" means "valuable," "precious," or "costly."

Scaphopods are a comparatively uniform group of exclusively marine mollusks, their most obvious distinguishing feature a cylindrical, tapered, tube-like shell, open at both ends, and usually curved to a greater or lesser degree, such that the concave side of the shell is dorsal. The larger of the two apertures is functionally anterior, and through this opening emerge both

— Continued on next page



Cross-sectional views of Tusk Shells (clockwise, from upper left): *Antalis weinkauffi, Fissidentalium vernedei, Dentalium octangulatum, Dentalium elephantinum.* Photo by Paul Monfils

Tusk Shells

— *Continued from Page 29*

the "anterior" head and the "ventral" foot. The soft inner parts are suspended from the dorsal wall of the shell, into which the animal can rapidly and fully withdraw by muscular contraction. There is no operculum.

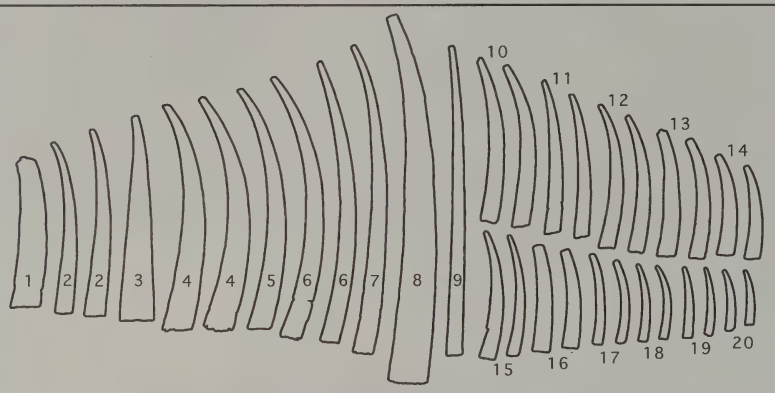
Approximately 400-450 living species have been described, plus a comparable number of fossil forms. Most species live offshore, in moderate to extreme depths. None frequent the intertidal zone, and only a small number of species live shallow enough to appear in the beach drift. Dead tusk shells may be carried into shallower water by hermit crabs, and in some areas where tusk shells are abundant, hermit crab species are found with straight, rather then coiled abdomens, a specific adaptation for inhabiting the available shells. A few scaphopod species have been collected at depths exceeding 5,000 meters (over 3 miles). A particularly interesting deep-water form is *Fissidentalium actiniophorum* (the name means "bearer of anemone"), found off the southwestern United States, which nearly always has a sea anemone growing on the dorsal surface of its shell.

Living scaphopods range in size from the minute Caribbean *Cadulus (Gadila) mayori*, less than 4 mm in length, to *Fissidentalium vernedei*, a hefty Pacific form measuring 140 mm by 15 mm maximum diameter (or roughly half the size of the largest known fossil species).

Some older publications erroneously depicted scaphopods embedded in the sea bottom with the wide anterior end protruding from the sediment, supposedly in "feeding position." Later works state that they live their adult lives lying obliquely buried in sand or mud, with the anterior end down, and the narrow posterior tip of the shell extending above the surface of the sediment. This would seem to be the usual orientation for many species, but recent research has revealed that at least some species may also actively burrow into the sediment to depths of 30 cm (12 inches) or more.

Scaphopod anatomy is relatively simple. The head is rudimentary, with a small mouth at the anterior end, but without eyes, tentacles, or other sensory features usually associated with a head. There is no heart. Gills are lacking, and the mantle does double duty, not only producing the shell but also extracting oxygen from the water. Special transverse folds or ridges in the mantle tissue increase its surface area for this purpose. Cilia slowly move water into the mantle cavity, through the small posterior aperture. Several times an hour, a violent contraction of the foot forces the water rapidly out through the same opening. The cycle consists essentially of a long, slow (up to 10 minutes) inhalation, followed by an instantaneous exhalation.

Scaphopods create a "feeding chamber" around the buried anterior end of the shell by pushing back the sediment with their muscular foot. Long, threadlike, club-tipped sensory and feeding organs called *captacula*, quite unlike anything else seen in the mollusca, then probe the walls of the chamber in search of detritus, diatoms, foraminfera (shelled protozoans), and other micro-invertebrates, including the larvae of other mollusks. Some tusks are rather general feeders, but many have highly specialized dietary requirements, accepting only specific species of forams. The captacula, equipped with cilia and mucus-secreting glands, capture the prey and transport it to the mouth, where a radula with strong, blunt teeth breaks it apart and draws it into the gullet.



Key to Photo on Page 29: 1. *Fissidentalium (Pictodentalium) formosum* (Adams & Reeve, 1848), Taiwan; 2. *Antalis weinkauffi* (Dunker, 1877), Japan; 3. *Fissidentalium hungerfordi* (Pilsbry & Sharp, 1897), Japan; 4. *Dentalium elephantinum* (Linne, 1758), Philippines; 5. *Laevidentalium (Calliodentalium) crocinum* (Dall, 1907), Japan; 6. Dentalium aprinum (Linne, 1767), Philippines; 7. *Dentalium longirostrum* (Reeve, 1843), South Africa; 8. *Fissidentalium vernedei* (Sowerby, 1860), Taiwan; 9. *Dentalium (Omniglypta) cerina* (Pilsbry, 1905), Japan; 10. *Dentalium (Pertusiconcha) callithrix* (Dall, 1889), Brazil; 11. *Antalis rhabdotum* (Pilsbry, 1905), Japan; 12. *Dentalium (Paradentalium) octangulatum* (Donovan, 1803), India; 13. *Dentalium vulgare* (DaCosta, 1778), Europe; 14. *Dentalium entalis* (Jeffreys, 1869), Europe; 15. *Dentalium (Graptacme) semipolitum* (Broderip & Sowerby, 1829), W. Mexico; 16. *Dentalium pretiosum* (Sowerby, 1860), W. North America; 17. *Dentalium (Graptacme) semistriolatum* (Guilding, 1834), Brazil; 18. *Dentalium laqueatum* (Verrill, 1885), Florida; 19. *Antalis disparile* (Orbigny, 1842), Brazil; 20. *Dentalium neohexagonum* (Sharp & Pilsbry, 1897), W. Mexico

After digestion, wastes pass through a coiled intestine, which opens into the mantle cavity, about halfway along the animal's length, and is finally expelled through the posterior shell aperture along with deoxygenated water. Once the food supply in the current feeding chamber is exhausted, the tusk shifts position in the sediment and forms another.

Scaphopods are dioecious, that is the sexes are separate. The female releases her eggs one at a time, through the posterior aperture of the shell, and fertilization occurs subsequently, in the water. The egg hatches into a free-swimming, ciliated larva, which remains in the plankton for a few days, never venturing far from the seafloor. A simple cap-like or disc-like shell forms on the dorsal surface, followed by rapid growth along the two lateral edges, enclosing the sides of the larva.

The embryonic shell at this point resembles the mature shells of the extinct molluscan class Rostroconcha, which had the appearance of gaping clams with a fused hinge line. For this reason some researchers theorize that rostroconchs may have been the ancient ancestors of scaphopods. In scaphopods however, shell growth progresses beyond the rostroconch stage, mantle and shell curving under the body and finally fusing along the ventral margins, forming a closed tube, which soon becomes calcified, dragging the animal to the bottom to begin its infaunal existence.

Scaphopods are the last class of Mollusca to appear in the fossil record. The oldest known species, *Rhytiodentalium kentuckyensis*, dates from the late Middle Ordovician (about 450 million years ago). Some other Ordovician fossils have been presented as possible scaphopods, but these might actually be pteropods (a group of pelagic gastropods) or even fossilized worm tubes. The difficulty in identification is due to the fact that early

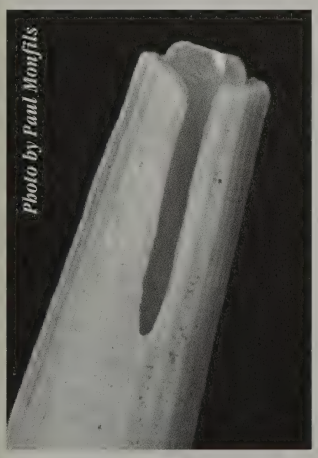
scaphopods tended to be smooth-shelled and straight. A hundred million years later, in the Devonian period, a number of obvious scaphopod species existed with curved, longitudinally ribbed shells, closely resembling modern *Dentalium*.

Scaphopods were originally classified as shelled worms. When anatomic studies revealed them to be mollusks, they were initially placed close to Fissurellidae – essentially very tall keyhole limpets! Pilsbry and Sharp raised the group to class status in 1897. Traditionally, scaphopods have simply been divided into two families, Dentaliidae and Siphonodentaliidae, based almost entirely on shell characteristics. Recent studies have shown that the taxonomy of the group is considerably more complex. Today most experts have come to recognize two orders: Dentaliida and Gadilida (or Siphonodentaliida).

***Cadulus (Polyschides) californicus* (Pilsbry & Sharp, 1898), dredged off Washington state is the U.S. at 300-350 meters. This is a representative of the family Siphonodentaliidae.**

Beyond that however, differences of opinion persist regarding the number of families (anywhere from 4 to 10) and genera (16 to more than 40) into which the Scaphopoda should be divided. The two orders differ significantly in both shell and soft-part morphology. Generally, the dentaliids have a gradually tapered shell which is largest at the anterior aperture, and may be either smooth or ribbed.

These are the typical "tusk shells" familiar to most collectors. Gadilids typically lack sculpture and have a thin, highly polished shell with the widest section some distance behind the aperture, giving them the appearance of tiny cucumbers – and they are tiny. The majority of species do not exceed a centimeter in length. The foot of dentaliids is conical and muscular, not unlike that of many burrowing bivalves. In Gadilida, the foot is slender, almost worm-like, and can expand at the tip into a flat, crenulated disk. There are also significant differences in the radular teeth of the two groups. *Entalina*, the earliest known genus of the order Gadilida, may represent a link between the two orders, as it combines the gadilid foot with the tusk-like shell characteristic of the Dentaliida.



Ventral view of the posterior end of *Fissidentalium vernedei*, showing the apical slit.

Other than their early use by Native Americans, tusk shells have not attracted much attention from our own species. Most modern people would not recognize them as seashells. They are too small to be of practical use as food. Even a large one would provide only a few grams of potentially edible material. In addition, many of them are relatively inaccessible due to the depths at which they live, and a dredge fine enough to catch them in quantity would likely fill quickly with mud and debris. And, even if there was a value (other than conchological) attached to tusk shells today, few modern folks would have the patience to pursue the Nootka method.

In addition to monetary use, Native American tribes also used tusk shells for personal adornment. Their natural bead shape made them easy to stitch onto leather garments. A sinew knotted on one end, with the knot drawn up inside the shell, made an attractive tassel; a series of them could be used to fringe the hem of a jacket or dress. Tusks were strung into necklaces and woven into elaborate chest pieces. Certain tribes also used them as nose adornment, passing a tusk shell (or other slender object) through a hole in the nasal septum. Early European explorers were so impressed with this practice that they commonly referred to natives of the region as "people of the pierced nose."

Unfortunately, the white men were not greatly adept at distinguishing among the various tribes who populated the area. The term was used rather indiscriminately, and finally came to rest on the dominant people of the region, despite the fact that they practiced nose piercing infrequently, if at all. Even so, the people of the Nez Perce – French for "pierced nose" – have retained the tribal name until the present day.

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The Odd Couple

Back Cover photographs by Phil Poland

Orthalicus floridensis (Pilsbry, 1899 — female, lower left), and *Liguus fasciatus* (Muller, 1774 — male, upper right) are shown in this series of three photos. Late summer is a magic time for tree snails. It's warm and wet in the woods, mold is thick on the trees, and an Orthalicid's fancy invariably turns to thoughts of love.

But snails of the family orthalicidae are few and far between in many hardwood hammocks these days. The urge is strong, time is short, and the choices are slim. This mating pair was found in Castello Hammock Park, just southwest of Miami, on a rainy morning in late August. In response to the initial flash from the strobes, the snails began to withdraw, allowing several unusual shots of snail anatomy.

As no hybrids have been found among the tens of thousands of tree snails seen by long-time enthusiasts, it seems unlikely that this pairing will produce any of the hoped for "Orthaliguus," a name coined by the park's naturalist, Roger Hammer.

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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America, Inc.

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CONCHOLOGISTS OF AMERICA, INC.

VOL. 29 No. 4 DECEMBER 2001

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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MEMBERSHIPS are for the calendar year, January-December, late memberships retroactive to January. 2002 DUES: (USA) $20.00; Postal surcharge: $5.00 for Canada and Mexico; $10.00 for other Western Hemisphere nations; $12.00 for Europe; $15.00 for Asia, Africa and the Pacific Rim. Please pay in U.S. dollars, or with a check on a U.S. bank with Transit Enrouting and Account Numbers printed at the bottom, or with money order; make checks payable to CONCHOLOGISTS OF AMERICA. **NEW MEMBERS** apply to Doris Underwood, MEMBERSHIP DIRECTOR. **RENEWALS** go to TREASURER, Phil Dietz. **BACK ISSUES** are available from PROPERTIES DIRECTOR Hank Foglino, 4 Trent Court, Smithtown, NY 11787-1266. Prior to 1985 $3.00 each; 1985 to current $5.00 each.

President's Message

I just looked at the calendar and the end of the year is fast approaching. Before we all know it, it will be Shell Show Season in Florida. If you are planning on coming to Florida during January, February, or March, check with Don Dan and the Conch-net site for dates and places of shows.

The convention in Sarasota is shaping up and dealers should be getting their packets shortly after the first of the year; the rest of us will get our registration material in the March issue of *American Conchologist*. Tom Rice reported the other day that they have almost narrowed down the hotel and dates for Seattle in 2003. We are looking forward to hearing about Seattle at the Sarasota convention. Be sure you save room on your calendars for both.

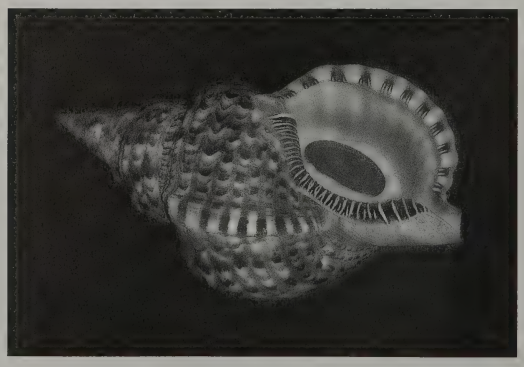
Speaking of *American Conchologist*, do you have an interesting story to share or some neat pictures you have taken? I am sure Lynn would even take some of the questions that I have seen on Conch-L. I guess what I am saying is that *American Conchologist* is your magazine, and we need your help. If you want to receive an interesting and beautiful magazine each quarter, each of you needs to think about what you or someone you know could write for the magazine. I am sure as shell clubs we have all used *American Conchologist* as a source of material for our club newsletters. Now is the time for "turnabout is fair trade." I know most clubs send Lynn copies of their newsletters, but nobody sends Lynn the time to read them. If you have an interesting article that one of your members has written, send her the article. You can even send it email. What could be easier?

Looking forward to seeing a lot of you in Sarasota.

Betty Lipe

ABOUT THE COVERS

On our front cover this month, a stunning Atlantic Triton (*Charonia variegata*) collected in Eleuthera at Millar's Beach. This is a particularly colorful specimen and the striking contrasts are often difficult to reproduce using conventional printing inks, but still — what a shell at just under 11 inches! Photo by **Jim Miller** using a Nikon FTn and 55mm Micro-Nikkor lens with Vivitar flash augmenting reflected sunlight. For more photos and details of the Eleuthera adventure, see page 4 of this issue!



Our back cover is by **Tim Blades** of Wilmington, NC, a longtime diver and shell collector. Tim and COA member Mark Johnson were diving on the wrecks off North Carolina in the summer of 2000 when he shot this gorgeous Deer Cowry (*Cypraea cervus*) at a depth of 80 feet. It was almost six inches long according to Tim.

COA TROPHY WINNERS *Edited by Charlotte Lloyd*

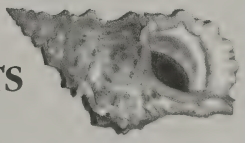
(Photo left) The Keppel Bay Shell Club, Inc. of Queensland, Australia held their Shell Show on July 21-22, 2001. **Irene and Arthur Prouse** won the COA Trophy with "The Life Cycle of Shells." They displayed egg cases, juveniles and mature adults of numerous shell families. Our congratulations to the Prouses.

(Photo right) COA member **Tom Grace** won his Trophy at the North Carolina Shell Show on September 13-15 of this year. Over 1,650 visitors viewed this beautiful exhibit showing 58 species and 13 subspecies of abalones. Also included: information about natural history, ecology, and the historical importance of abalones. Great job, Tom.

The Belgium Society for Conchology held its Eleventh International Shell Show on the 5-6 of May 2001. **Charles Krijnen** of The Netherlands won the COA Trophy with his 100' exhibit, "The Genus *Nerita* and its Subgenera." Displayed were all valid species and the most recent concepts concerning Genus *Nerita*. *(photo not available.)*

2002 WINTER AND SPRING SHELL SHOWS AND OTHER EVENTS

by Donald Dan, COA Trophy Director



Jan. 18-20 SPACE COAST SHELL FESTIVAL, Melbourne, FL
The Melbourne Auditorium, 625 E. Hibiscus Blvd.
Jim & Bobbi Cordy, 385 Needle Blvd.
Merritt Is., FL 32953
E-mail: *cordy@yourlink.net* (321) 452-5736

Feb. 1 – 3 BROWARD SHELL SHOW, Pompano Beach, FL
Pompano Beach Recreation Center, NE 18th Ave. & NE 6th St.
Jim VunKannon, 2219 NE 16th Court
Ft. Lauderdale, FL 33305 (954) 561-0120

Feb. 15-17 NAPLES SHELL SHOW, Naples, FL
The Nature Conservancy, 14th Avenue N.
Gary Schmelz, 5575 12th Ave. SW Naples, FL 34116
E-mail: *schmelz@att.net* (941) 455-4984

Feb. 15-17 SARASOTA SHELL SHOW, Sarasota, FL
Sarasota Municipal Auditorium, Tamiami Trail
Lynn Gaulin, 3417 58th Ave. W. Bradenton, FL 34210
E-mail: *ehgaulin@worldnet.att.net* (941) 755-1270

Feb. 22-24 ST. PETERSBURG SHELL SHOW, Treasure Is., FL
Treasure Is. Community Center, 1 Park Place
Bob & Betty Lipe, 348 Corey Avenue
St. Petersburg Beach, FL 33706
(727) 360-0586; FAX: 360-3668 E-mail: *rlipe1@tampabay.rr.com*
Exhibits accepted at web site: *www.theshellstore.com*

Mar. 1 - 3 SANIBEL SHELL SHOW, Sanibel, FL
Sanibel Community Center, Periwinkle Way
Richard Willis, 5305 Darby Court, Cape Coral, FL 33904
(941) 540-7380 E-mail: *rwwillis@ix.netcom.com*

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Mar. 14 – 16 MARCO ISLAND SHELL CLUB SHOW XIX, Marco Is., FL
Wesleyan United Methodist Church, Barfield Road
Jean Sungheim, P.O. Box 633
Marco Island, FL 34146 (941) 642-7247

Mar. 9 –10 XIVéme RECONTRES INTERNATIONALES DU COQUILLAGE
Espace de Blanc Manteaux, 48 rue Vieille-du-Temple, Paris, France
M.& D. Wantiez, 88, Rue du General Leclerc
92210 Saint Gratien, France 33 (1) 34-17-00-39

Mar. 23-24 4TH AUSTRALIAN NATIONAL SHELL SHOW, Brisbane, Australia
Creek Club & Convention Center, 29-31 Emondstone St., S. Brisbane
The Shell Show Committee, MSA Qld Branch
PO Box 64, Brisbane 4004 E-mail: *msaqld@powerup.com.au*

May 4 –5 CENTRAL FLORIDA SHELL SHOW, Orlando, FL
Central Florida Fairgrounds, Exhibition Hall A, 4603 W. Colonial Drive
Phyllis Gray, 1212 S. Eola Drive, Orlando, FL 32806
(407) 422-0253 E-mail: *pgray@kennesaw.lawco.com*

May 4 – 5 XXII BELGIUM INTERNATIONAL SHELL SHOW, Antwerp, Belgium
Schijnpoort, Schijnpoort Straat
R. De Roover, Vorsterslaan 7 2180 Ekeren-Donk, Belgium
32 (3) 644-3429 E-mail: *bvc.deroover@village.uunet.be*

Jul. 13-18 COA CONVENTION, Sarasota, FL
The Hyatt Hotel, 1000 Boulevard of the Arts
Peggy Williams, P.O. Box 575, Tallevast, FL 34270
(941) 355-2291 E-mail: *shellelegant@mindspring.com*

6704 Overlook Drive, Ft. Myers, FL 33919, U.S.A.
Tel. (941) 481-6704 E-mail: *donaldan@aol.com*

Eleuthera: 100 miles of shelling paradise

Text and photos by Jim Miller

I awoke from a sound sleep and glanced at the bedside clock. Its bright red LED display told me it was 3:58 AM and I remembered then that the alarm was set to go off at 4 AM as we had to be at the Tallahassee airport in an hour for a 6 AM flight to Fort Lauderdale. I reached over and switched off the alarm, not wanting to hear its awful racket. I gently woke my wife, Margo, who expressed her extreme displeasure at being disturbed at such an unholy hour. I reminded her of our flight and we both staggered out of bed.

Finally, after three straight weeks of nearly non-stop work – 14 and 15 hour days that seriously threatened my sanity – I was finally going on vacation. One problem: Because of the heinous acts of terrorism that occurred on September 11th, flight schedules had changed radically and we had to fly to Fort Lauderdale early in the morning, arriving at 7 AM, only to wait there until 1 PM for the flight to our final destination: Eleuthera Island in the Bahamas. Sitting at Fort Lauderdale airport, trying not to fall over in my chair, I had to keep reminding myself that in less than seven hours I would be snorkeling in the crystal clear waters of the Bahamas. I read a book, we walked the concourse, browsed a few shops, had breakfast, dozed briefly in those remarkably uncomfortable airport chairs.

A huge, 13-inch *Cassis madagascariensis* with a burnt orange parietal shield dominates the forground, while the serene beauty of Tarpum Bay with its crystal clear water make for an unforgettable backdrop!

Finally, close to noon – five hours after our arrival – we hailed a cab for the short drive over to the Fort Lauderdale Jet Center, where our chartered aircraft would soon whisk us out over the Atlantic to our destination, about 100 miles east. As we got out of the cab, we were immediately met by Jim Cordy, who loaded our baggage onto a cart and told us to follow him to the Twin Air terminal. This trip we were going with Jim and Bobbi Cordy of the Astronaut Trail Shell Club who do the Eleuthera trip three times a year and, after many years, know all the very best spots for shelling there. Inside, we met Bobbi and the other members of our group: Anne Dodge, Jim and Bessie

Cooke and Bill Simon, who also had some challenging connections to get from Colorado to Florida.

Soon we were loaded into a pair of 7-seater prop planes (which looked awfully small to me), and within minutes had taxied out onto the runway and taken off. On this, only my second time in a small plane, I expected to be nervous (if not downright terrified! — flying is not my favorite activity), but the ride was so smooth, the view out the big windows so impressive, that I quickly forgot all of my fears. I found myself having a great time as we passed over one island, then another: Andros, Bimini, the Berry Islands, New Providence. Below us the water was every conceivable hue of blue and green. Flying at about 10,000 feet we were actually able to see all the shallow reefs, grass beds and sand bars. This was like the best ride at Disney World — times ten!

***Cymatium femorale* and (below right) a gem *Chicoreus florifer*, both found at Glass Window.**

About an hour into the flight, we began our descent into Eleuthera and the Rock Sound airport. Our pilot lightly touched the aircraft down and taxied right up to the customs building where we were warmly greeted, cleared, and sent on our way. We would be staying — as the Cordys' groups always do — at Ethel's Cottages in Tarpum Bay on the west side of the island, about 20 minutes from the airport. Conveniently, Ethel had two rental cars waiting for us, and we loaded in our luggage and were off. Within an hour now, I thought to myself, we would be snorkeling in the warm, clear water right outside the cottages.

Oops! As we crested the hill that gave us our first view of Tarpum Bay, we saw that a brisk wind was coming directly out of the west, churning the water into a frothy, soup-like consistency with virtually no visibility. Not to worry, Bobbi told us, it would calm down soon. Minutes later we pulled into our accommodations for the next five nights. Ethel's Cottages are old (oddly, our cottage had the same bathroom I had in Miami in 1959) but clean and comfortable with plenty of fresh linens and air conditioning in each of the bedrooms. It turned out that Margo and I had the third cottage all to ourselves which was a treat as we had not seen much of each other for many weeks.

While the others unpacked, Jim Cordy, Bill Simon and I set off to find a place to snorkel on the east side of the island which was protected from the winds (normally it's the other way around). I should point out here that at the time I was suffering from a painful condition called spinal stenosis and would be having surgery a few weeks after our return. Jim found us a gorgeous beach with a wonderful shallow reef close in and I made straight for the water as the near weightless condition you experience in salt water almost instantly relieved what at that point was nearly unbearable pain.

Unfortunately, by this time it was already about 4 PM, so we didn't have much time, but we all found some gorgeous tellins (in particular, some spectacular *Tellina radiata*) and my big find of the day, a 12 1/2-inch West Indian Chank (*Turbinella angulata*) that was buried in the sand at the edge of the reef (see photo on page 25). I almost passed it by as only a tiny bit of the dorsum and the siphonal canal was showing and I thought it was probably dead, but at the last second dove down about 15 feet and pulled up my prize. This particularly fine specimen quickly made me forget all the hardships we had endured in getting here.

It's interesting to note that although less than 100 miles separate Florida from the Bahama Islands, there are no Horse Conchs (*Pleuroploca gigantea*) there. The species is effectively replaced by the West Indian Chank, which is not found in Florida. Other common Florida species like *Busycon sinistrum*, *B. spiratum* and *Oliva sayana* are not to be found anywhere in the islands, either. However, a number of shells such as *Phyllonotus pomum*, four species of *Strombus* and *Cypraea zebra* are all fairly common in both the Bahamas and Florida. Evolution is a mind-boggling thing!

After dinner we made plans to leave at 8:30 the next morning for our destination that day, Cape Eleuthera. After a long day we were exhausted and it seemed like only a few hours later that the sun was up and we heard everyone else packing their gear into the cars, so we grabbed a quick breakfast and joined the group for the hour and 15 minutes drive. Once at Cape Eleuthera, we pulled into a shaded area right at the edge of a nice lagoon. After the somewhat rough ride and cramped quarters of the car, I made record time in getting to the water.

The lagoon was mostly sand, with some grasses where I found three very nice (though small and probably male) *Strombus raninus*, several dwarf Queen Conchs (interesting, but fairly unattractive) and three of what had to be the ugliest *Phyllonotus pomum* I have ever seen (see page 23). I had to take one because they were just so unlike any Apple Murex I had ever seen. When I got back to shore, Margo held up her find: a small but gorgeous *Cassis tuberosa* (see page 25).

Following a quick lunch, we planned to motor over to the other side of the lagoon where the shore is mostly rocky. Unfortunately, one of the cars had a dead battery, so Jim Cordy dropped Margo, Bobbi, Bill and me off to explore while the rest of the group tried to get help. During the long wait, we looked under every good-sized rock and I eventually found two *Cypraea zebra* (small, but nice and dark) while Margo scored another superb *Cassis tuberosa* (she seems to have a knack for finding this species). Bobbi found a rather small *Charonia variegata*, but it was in such poor condition that we left it. Bill meanwhile appeared with a huge *Cassis tuberosa*. Though it had some black lip disease, its sheer size dictated that he keep it. As it turned out, he had found several smaller specimens, but chose to leave them to reproduce.

By now it was nearly 5 PM and we were all tired. It was too hot to get out of the water (no shade at this spot), but the incoming tide was starting to buffet us around. Just when we had almost given up hope, the car arrived. We were all just happy we didn't have to spend the night there!

The next morning, Jim Cordy and Bill Simon decided to hit Winding Bay, where over the years Jim has found

— Continued on page 23

Discovering Offshore Surprises

Morum lamarcki (Deshayes, 1844), 17mm, off Alcobaça, near Abrolhos National Marine Park, Bahia, Brasil

Photo by Marcus Coltro

by José Coltro Junior

Some months ago my diver and friend, Alfredo Bodart, found a new and incredible spot for shells. He was seeking a new place to get lobsters when he found a coral reef 70 kilometers (42 miles) east of Alcobaça, southern Bahia State, on the Central Brazilian Atlantic coast.

This reef is the border of the Abrolhos Bank, the largest Southern Atlantic coral reef area. It is an extremely beautiful formation, with some very small islands — the National Park of Abrolhos Archipelago — and thousand of exposed coral reefs.

Many of the species — shells, fishes, crabs and corals — are endemic to this area. Dr. E. J. Petuch found dozens of new mollusk species on his expedition there in the late 1970s.

This offshore reef is a sand area with few stones and many corals at depths from 12 meters to 35 meters outside the reef the depths go from 100 to 2000 meters! The area is natural habitat for thousands of sharks — and big ones. The currents are very strong most of the year, except during the summer time (December to March), when the reef is covered by a dense algae formation and hundreds of whales are around. Then it becomes impossible to dive for shells.

On four expeditions, Bodart found many new species: one *Calliostoma*; one *Astraea*; one *Trivia* (Fantastic! It looks like a South African *Trivia*); one *Volvarina*; one *Enaeta*; many Turrids; four or five *Conus*; and many bivalves. Some other known species were found, but with different shapes than those of the previously known forms: *Plicoliva zelindae* (that one I am calling the "oceanic" form); *Cypraea acicularis* and a very colorful *Columbella mercatoria*.

The *Conus* population is extremely variable, with some really beautiful new species. There, Bodart found some huge and heavy *Conus regius*, many of them very colorful. On this last expedition he found a live *Conus* aff. *magellanicus* — very similar to the Martinique population. He also found a new black with white striped *Conus* that he called "timbalada" after a singing group from this area, an Afro-Brazilian group that paints white stripes on their bodies. This very attractive species has already been studied by Brazilian biologists.

On the reef he found some *Turbo heisi* — before that this species was known only from a very small area almost 800 kilometers south, in another offshore reef north of Rio de Janeiro State. Other species, like *Bullata largilieri*, *Pisania pusio* and *Prunum fulminatum* are well represented, but again, the colors and shape are really unique. When Dr. Paulino Souza saw the *Bullata largilieri*, he was really excited and now he is studying it to compare with the continental species.

Another species that shocked Dr.Souza and his colleague, Dr.Luis Ricardo de Simone, was the new *Astraea*, a beautiful red-cream shell with a very nice operculum. Unfortunately only two specimens were found. It seems that this area will produce many new species and I hope that Bodart can return to the area after March, when the algae disappears.

KEY: A) *Conus worki* (Petuch, 1998), 70km off Alcobaça, southern Bahia State, Brasil, 50.6mm; B) *C. aff. iansa* (Petuch, 1979), 18mm, C) *Conus sp.*, 18mm, D) *Conus sp.* 18mm E) *Conus sp.*, 18mm, F) *Conus sp.*, 17.5mm all from 70km off Abrolhos Archipelago, southern Bahia State, Brasil.

— *More photos on Page 28*

The Channeled Applesnail *(Pomacea canaliculata)* Invasion: A threat to aquatic ecosystems and the price of Rice Crispies

Text and photos by Robert G. Howells

The early 1980s saw the start of an interesting chapter in snail culture, a new spin on escargot, and unforeseen negative ecological and economic impacts. South American channeled applesnails (*Pomacea canaliculata*) were taken to the Philippines, Taiwan, and elsewhere in Southeast Asia. Proponents encouraged their culture as a source of "Asian escargot." They were dubbed "golden apple snails" in reference, not to their color, but to the amount of money snail wranglers could make raising them. Unfortunately, much like 8-track tapes and Edsels, the concept just didn't fly (or even crawl slowly, as the case may be).

(Above) *Pomacea canaliculata* is a tennis-ball sized aquatic gastropod that has been introduced in Texas, Florida, and California, probably releases or escapes of pet and aquarium trade specimens. (Below) Channeled applesnails in normal and golden color varieties. Florida and spiketop applesnails also occur in gold or albino variants.

In time, channeled applesnails escaped or were released. The snails, like the local folks, developed quite a taste for rice. These shelled vermin now cause extensive destruction of rice crops throughout this area. In 1989, these snails were also introduced into Hawaii with somewhat similar results. Though some are actually harvested and eaten there, they attack Hawaiian rice and taro as well.

Applesnails in the genus *Pomacea* (Family Ampullariidae, previously Pilidae) comprise about 50 species of moderate to large-size freshwater gastropods whose natural range extends from Florida and some Caribbean Islands through Central and South America (Perera and Walls 1996). The Florida applesnail (*P. paludosa*) from peninsular Florida is the primary food source of endangered Everglades kites. Another South American species, spiketop applesnail (*P. bridgesii*) has become the snail most frequently sold in the aquarium trade.

Florida and channeled applesnails sometime appear in pet stores, but both consume aquarium plants and are less desirable than spiketops that prefer rotting vegetation (a lot more fish-bowl friendly). Channeled applesnail is the largest of the three, reaching the size of a tennis ball. Applesnails are aquatic and breathe with gills, but an additional lung-like structure also allows them to forage above the waterline. They leave the water to lay grape-like egg masses, often on solid objects, well above the water.

Both spiketop and channeled applesnails have been introduced into Florida, with two introductions of the latter in California as well. However, none were in significant agricultural areas. Shells of Florida and channeled applesnails had been found in Texas, but all were probably isolated aquarium releases. An additional population of channeled applesnails found in the Houston area overwintered between 1989 and 1990 (Neck and Schultz 1992), but by the late 1990s, none were known to still exist in Lone Star waters (Howells 2001a).

However, this all changed in July 2000 when a local resident found a living channeled applesnail in the American Canal between Houston and Galveston in southeastern Texas and reported it to the Texas Parks and Wildlife Department (TPWD).

Within days, TPWD staff examined two sites on the American Canal and confirmed a reproducing population was present. Specimens were sent to David Robinson (Philadelphia Academy of Natural Sciences) and Doug Shelton (Alabama Malacological Research Center) to confirm species identification. Concerns arose because this location was an irrigation canal in the middle of the Texas rice belt (supporting a billion dollar a year industry).

During the following months, Ray Macek (Gulf Coast Water Authority) discovered snails elsewhere in the American Canal and in adjacent Mustang Bayou. In November 2000, the U.S. Department of Agriculture arranged a conference to discuss this issue and consider options. Heavy rains delayed additional planned fieldwork on several occasions.

Finally, in December 2000, four local shell clubs (Houston, Brazosport, San Antonio, and Corpus Christi) provided volunteers (including Roe Davenport, Clifton Harris, and Harold White) who joined with three other volunteers from the Texas Master Naturalist Program (Pauline Singleton, Carol Kelly, and Linda Kato) for a more detailed survey of the area (Howells 2001b). In the following weeks, these volunteers continued to examine locations around Alvin, Texas, between Houston and Galveston. Ultimately, channeled

applesnails were found in 6–7 km of the American Canal and 37–38 km of Mustang Bayou, as well as Halls Bayou, Chocolate Bayou, and the Briscoe Canal. Additionally, a population reported earlier in the Hedwig Village area of Houston (Neck and Schultz 1992) was found surviving and another in a borrow pit at Barker Reservoir (both Buffalo Bayou drainage) was reported by Kristine Brown of the U.S. Army Corps of Engineers. The American Canal and Mustang Bayou populations found in December were confirmed to have overwintered successfully and they had started to reproduce by April 2001.

The story took an additional turn in March 2001 when Matt Berg, a student at Texas A&M University-Galveston, reported large applesnails and their eggs at a lake in Bedford near Fort Worth. Yet another volunteer, Marv Eisthen (Management Solutions, Dallas), confirmed snails were present at this site and sent specimens to TPWD for examination. Channeled applesnails had not only survived winter in the Houston-Galveston area, but had endured Christmas in Fort Worth. Though not exactly the Arctic tundra, winters in Fort Worth are cold enough to freeze the hair of a longhorn's . . . well, let's just say . . . really cold.

In early June 2001, Tropical Storm Allison rolled over the American Canal area, dumped 26-40 inches of rain, and caused extensive flooding. How much farther this flooding may have distributed channeled applesnails is undetermined thus far, but the prognosis is not encouraging. To date no significant reports of agricultural damage have reached TPWD, but it may be too early in the invasion to expect heavy crop losses.

In the 1980s, a related species in the same family, giant rams-horn snail (*Marisa cornuarietis*), was found in spring waters of the San Marcos and Comal rivers in Central Texas. Populations increased and began to damage aquatic habitats needed by several endangered species (Howells, 1999, 2001a). More recently, this snail also turned up in the headwaters of the San Antonio River. These populations likely originated from aquarium releases. However, giant rams-horns are somewhat cold sensitive and cannot survive downstream more than a few miles from the thermally-stable waters at the spring heads.

Channeled applesnails are not only larger and more voracious than their rams-horn cousins, but are substantially more cold tolerant. If introduced at these same sites, they could cause major ecological damage that may not be reversible. Aquatic plants that provide spawning and nursery areas for important sport fishes throughout the state could also be at risk.

Spiketop applesnail has dominated snail sales in the pet and aquarium trade in recent decades. But, upon checking, it became apparent channeled applesnails were beginning to appear with increasing regularity throughout Texas and elsewhere in the country. Indeed, at least two reports reached TPWD of individuals harvesting these snails from the American Canal for sale and distribution. All of this was completely legal. Therefore, on April 30, 2001, channeled applesnail was legally prohibited as a harmful exotic species in Texas. Possession, sale, and transportation of living specimens are now violations of state regulations. Collectors can take living specimens, but must kill them upon capture.

All other species of applesnails are still legal in Texas. However, state law prohibits release of any fishes, shellfishes, or aquatic plants into state waters, except native baitfish, unless permitted by TPWD. Release of almost any species, especially exotics, would not only be ecologically dangerous, but clearly illegal.

(Top) Feral forms of channeled applesnail have wide variations in banded color patterns. (Bottom) Spiketop applesnail (*Pomacea bridgesii*) is sold in the aquarium trade, usually under the incorrect name "mystery snail."

Decades ago, the pet trade sold mystery snails (Viviparidae) of American and Asian genera *Viviparus* and *Cipangopaludina* for home aquaria. These were not tolerant of high water temperatures often maintained for tropical fishes, so when warmth-loving applesnails began to appear in the trade, Viviparidae were quickly replaced, but the name "mystery snail" was incorrectly retained.

Some dealers sell spiketop applesnail as "mystery snail" and call channeled applesnail "Peruvian apple snail" (and may use the archaic name *Ampuilla gigas* as well). Applesnails have also become available in water garden outlets for use in home lily ponds (where escape is easy) and through Internet pet supply sites.

Unfortunately, even with the legal restrictions in Texas, terminology and correct identification still create problems. Aquarists, pet dealers, naturalists, and shell collectors are all still largely unaware of channeled applesnail introductions, the threats they pose, or the current legal status of this species.

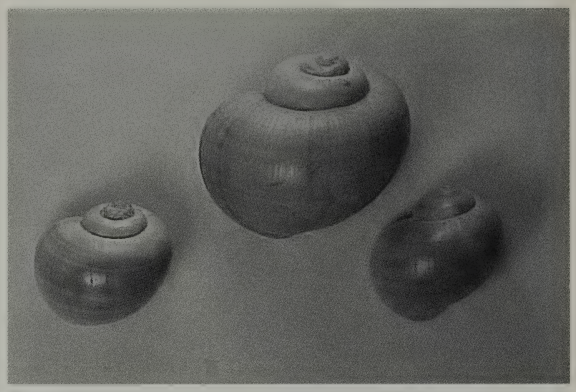
Rice was once exported from the Philippines, but with the establishment of channeled applesnail, it must now be imported! How much ecological and agricultural damage will eventually result from the U.S. introductions, only time will tell. All too often, when an exotic species is introduced and becomes established, it cannot be removed.

Though apples may not fall far from the tree, applesnails — with a little human assistance — get around far too well.

BioStudies, 160 Bearskin Trail, Kerrville, TX 78028; ajoy@ktc.com

Note: On November 5, 2001, Dr. Alan Hardy (California Department of Food and Agriculture, Sacramento) reported a reproducing population of channeled applesnails was found in a drainage canal near the Salton Sea. This is at least the third confirmed population in the state.

— Additional photos and references on page 10



Apple Snails

— Continued from Page 9

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A novel collecting habitat

In August 2001, game wardens called me to the Houston area to identify prohibited exotic fishes that were being sold illegally in Asian fish markets there, including snakeheads and Japanese eels. Many of these food markets had an unbelievable array of mollusks alive, frozen, and on ice. There were a number of species of both gastropods and bivalves that I had not seen before and was at a loss to identify. Pacific oysters (Crassostrea gigas) are a legally prohibited exotic shellfish in Texas and game wardens seized that species, but sale of the other taxa found was not prohibited. If COA members in cities with ethnic food markets haven't checked them out as a source of specimens, they might consider doing so. I saw species I had only encountered in text books. — *Robert G. Howells*

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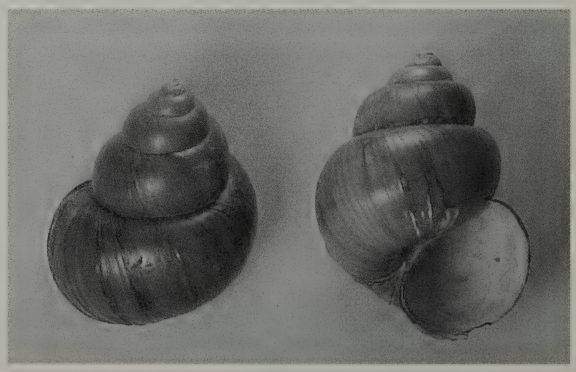
(Top left) Giant rams-horn snail (*Marisa cornuarietis*) has also been released in U.S. waters. In Texas, it has done damage to aquatic plants in San Marcos and Comal springs where several endangered species occur. Luckily, limited tolerance to cold has restricted its distribution. (Top right) Florida applesnail (*Pomacea paludosa*) is native to Florida. It does not grow as large as channeled applesnail, has a depressed spire, and lacks the channeled sutures. (Above) Channeled applesnails and other species lay bright pink egg masses above the water line, often on solid objects. During field surveys, egg clusters are sometimes more easily located than the snails themselves. Egg colors change and masses become whiter with age. Other species of applesnails may produce egg masses of other colors. (Below) Chinese mysterysnail (*Cipangopaludina chinensis malleata*) was once sold as "mystery snail" in the pet trade, but was replaced by applesnails that were more tolerant of warm temperatures often required by tropical aquarium fishes.



Research funded by the Conchologists of America

COA has provided over $80,000 in funding for malacological research since the inception of the grant program in 1985. Grant recipients are encouraged to submit a summary of their results for publication in *American Conchologist*, and a number of them have done so over the years. Grantees, however, often prefer to publish their results first in scientific journals. Since the gestation period for a research project can be long, with COA funding only a small part of a larger project, it might be a number of years before any publications results.

Preliminary results are often presented at scientific meetings; for example, eight recipients of COA grants presented their research at the World Congress of Malacology in Vienna, Austria, August 19-25, 2001. In their presentations, grantees invariably acknowledge the support that they have received from COA and other organizations.

CONCHATENATIONS
by Gary Rosenberg

Since most COA members do not attend scientific meetings or have access to scientific journals, the results of grant funding are not always readily apparent. I have therefore compiled a summary of results of some of the grants funded from 1995 to 2000, relying on papers published in the scientific literature, reports submitted to me in the capacity of chairman of the COA Grants Committee, and abstracts of presentations at the World Congress of Malacology (WCM) or the American Malacological Society (AMS). In cases where the grantee has relocated since the grant was awarded, I have given the current institutional affiliation.

Colin R. Beasley (2000), Universidade Federal do Pará, Brazil, surveyed the species richness and abundance of mollusks in mangrove forests, estuaries and sandy beaches along the northeast coast of Pará, a state in northern Brazil. These habitats are coming under increasing pressure from exploitation and development. The survey found a total of 24 species of bivalves, 8 of which are collected for human consumption, and 12 species of gastropods, some of which have restricted distributions in Brazil (e.g., *Terebra imitatrix* Auffenberg & Lee, 1988 and *Thais coronata* (Lamarck, 1816). Data from this study should be useful in targeting areas for conservation. [Report to grant committee]

James E. Byers (1997), University of California at Santa Barbara, investigated the decline in populations of *Cerithidea californica*, a species native to California salt marshes, to see if it could be attributed to competition with *Batillaria attramentaria*, a species introduced from Japan. Both species feed on diatoms (a type of single celled plant). By manipulating densities of snails in test plots, he was able to demonstrate that *Batillaria* was better at converting food into tissue, that is, it grew more efficiently. This suggests that *Batillaria* is outcompeting and replacing *Cerithidea*. [Byers, J. E. 2000. *Ecology 81*: 1225-1239.]

Rachel Collin (1998), University of Chicago, reported parallel losses of structure and function in larvae of calyptraeid gastropods with direct developers. (Direct developers hatch directly to crawling juveniles rather than planktonic larvae). First, ciliary bands on the velum are lost, then the velum itself, then the operculum. In one case planktonic feeding larvae re-evolved from direct developers (before feeding structures had been lost), which shows that direct development is not necessarily an irreversible condition, as had previously been thought. [WCM 2001]

Thomas F. Duda (1995), Harvard University, used DNA sequences to unravel evolutionary patterns in *Conus*, one of the most species-rich genera known. Part of the basis for that diversity is specialized predatory habits. The primitive pattern in *Conus* turns out to be worm-eating; fish-eating behavior has probably evolved more than once. The mollusk-eating tented cones form a "clade," that is, a single branch on the evolutionary tree. Overall, dietary patterns are conservative, with few instances of evolution of major new feeding modes. [Duda, T. F., Jr., A. J. Kohn and S. R. Palumbi. 2001. *Biological Journal of the Linnean Society 73*:391-409.]

Steve Lonhart (1998), University of California, Santa Cruz conducted a mark-and-recapture study of *Kelletia kelletii*, which recently invaded central California, expanding its range from the south. He found the whelks had high site fidelity, some individuals being recaptured annually since 1997 within the same 50 x 50 m area. Growth rates in snails larger than 50 mm (2 inches) were around 2 mm per year, and in those larger than 80 mm, less than 1 mm per year. This suggests that some individuals live more than 20 years. [WCM 2001]

Guido Pastorino (1997, Walter Sage Memorial Grant), Museo Argentino de Ciencias Naturales, revised the Patagonian genus *Xymenopsis* (Muricidae, Trophoninae), in collaboration with M. G. Harasewych. Four recent species were recognized: *X. buccinea* (Lamarck, 1816), *X. corrugata* (Reeve, 1848), *X. muriciformis* (King & Broderip, 1832), and *X. subnodosa* (Gray, 1839). Another 26 names were treated as synonyms and four others were excluded from the genus. Type material for most names was illustrated. [Pastorino, G. and M. G. Harasewych. 2000. *The Nautilus 114*:38-58.]

Rebecca M. Price (1999, Walter Sage Memorial Grant), University of Chicago, is trying to explain the function of columellar folds. Her dissections of *Leucozonia* (Fasciolariidae) revealed that the attachment of the columellar muscle is not coincident with or parallel to the columellar folds. This suggests that the columellar folds do not guide the muscle, or increase the surface area for its attachment, contrary to previous hypotheses of function. Ongoing studies will test additional hypotheses. [AMS 2000.]

Rebecca J. Rundell (2000, Walter Sage Memorial Grant), University of Hawaii, tackled the phylogeny and origins of diversity of endemic Hawaiian Succineidae. This group has suffered the least extinction among the families of Hawaiian land snails and therefore offers the best hope of recovering evolutionary patterns. Species on the younger islands generally have larger geographic ranges than those on the older islands, a pattern consistent with the idea of a "taxon cycle," proposed by E. O. Wilson. The taxon cycle suggests some species are good at colonizing, but, once they have arrived in a new territory, might evolve into more specialized forms less able to disperse. [Report to the grant committee]

Anthony B. Wilson (1999), University of Konstanz, Germany, working with Matthais Glaubrecht and Axel Meyer, used DNA sequences to investigate the gastropod fauna of Lake Tanganyika, which is the deepest of the African rift lakes and the oldest, at more than 10 million years. In contrast to the pattern in cichlid fishes, which have diversified within the lake since its formation, the radiation of snails predates the formation of the lake. Lake Tanganyika turns out to be an important reservoir of gastropod lineages that have been extirpated elsewhere. [WCM 2001]

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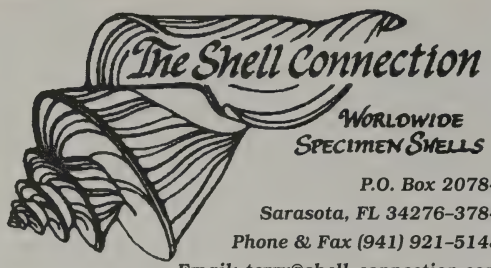

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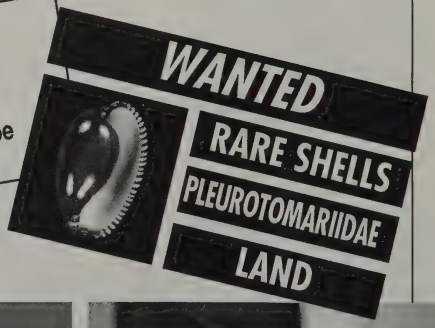

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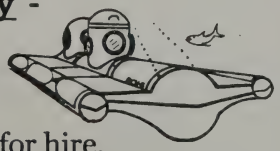

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New finds at Aligbay Island, Philippines

by Philip Clover

Depending on whether you believe Geodetic Survey Maps or local residents, this Philippine island is known as either Aligbay or Aliguay. I prefer Aligbay, as this is what the island is called by those who live there. In either case, so many new shells have been arriving in Cebu from this locality that I decided to go see for myself. A small, flat, oblong 1x2 kilometer island, Aligbay is located halfway between Dipolog in northern Mindanao and Dumaguete, southern Negros Island, about ten or fifteen kilometers or an hour or two either way via Banka boat, depending on wind and weather.

A selection of unusual and exciting new finds from Aligbay Island

Aligbay compares well to Balicasag Island in southern Bohol in size and in the number of fishing families (about 50) who are looking for rare, deepsea shells. My main interest in visiting Aligbay was to see how they are dredging so many species that are new or were formerly rare species in Balicasag or the Balut area. Off Bohol/Cebu, the depth abruptly drops to 600 feet, so tangle nets are the most practical way to collect the deepsea shells. On the other hand, Aligbay has a gentle, sloping bottom from 60 to 150 meters (80 fathoms) with few stones and no big coral growths to hang up a dredging net. From Balut to South Luzon only tangle nets have worked well, but now these Aligbay fishermen have also gone into dredging — and in a big way.

Heavy steel dredges would be way too expensive and would require large boats: it requires 300+ meters (1000 feet) of cable to dredge in 100 feet of water! In Aligbay, the fishermen are able to use small, 5-10 meter (up to 30 feet) Banka boats, by mounting them with a small, hand-wound winch carrying 5 mm (1/2 inch) rope. The dredge consists of a half pie shaped net with half inch (10 mm) nylon mesh. The net is 4 meters across by 2 to 4 meters deep and has dozens of lead weights on the bottom half, floats and a ridged pole above to hold its shape, and two side stones to make it slide along the bottom more easily (see photo at right).

This simple but ingenious device is a very effective way for native fishermen on a small budget to collect many deep sea shells; and with fifty or so boats working off Aligbay, they are really finding some treasures!

Most dealers and collectors traveling to Cebu are excited about large rare species like *Conus tisii, Conus pergrandis, Cypraea hirasei, C. katsuae, C. musumea, C. langfordi, C. teramachii, Murex loebeckii* and others. For me, the most interesting finds are the hundreds of small and unknown *Conus, Epitonium, Mitra, Cancellaria, Buccineum, Terebra* and various turrids, not to mention some shells that experts cannot place in any family, much less give a name!

Aligbay dredging is different from tangle nets that only bring up alive or crabbed shells. Shells from Aligbay are in every condition from alive to fresh dead, crabbed, and long dead. Many species that never climb on a tangle net get swept up in the Aligbay dredges. The colors and variations are extreme, and the shells come up in large numbers, making this dredging operation welcome to collectors and scientists alike.

What's it like on Aligbay? I was warned that it is very dangerous and remote. Dangerous? I imagine staying there too long so that it becomes widely known that a foreigner is there could be a problem, especially when one considers the recent kidnappings that have taken place in Mindanao and Palawan! But you only live once, and with over forty years in the shell and travel business, I did not let those concerns bother me. I traveled only with a friend/guide, and we stayed only two days, without advance warning.

But remote? Aligbay is that, for sure! We left Cebu for Dumaguete in luxury, on the air conditioned SuperCat hydrofoil, traveling for more than three hours amidst food service, movies, and reclining seats. In Dumaguete we boarded a large, slow ship without air conditioning, carrying hundreds of passengers in three travel classes, mostly crowded, on a cot/bunk. This leg of the trip, also three hours long, goes to the small, quiet town of Dipitan, near Dipolog in northwest Mindanao. Once there one usually has to roam around hunting for a Banka boat for the last leg of the journey. In our case, however, a friend of a friend, who goes weekly to Aligbay, met us with a small boat.

As I boarded, I was handed a large, plastic tablecloth! Confusing! I often travel in this area but had no idea what to do with the tablecloth. I soon learned! The next ninety minutes in the 18 foot Banka was all against wind and waves; the tablecloth protected not only me, and my guide, but all our back packs too! This last leg is not an experience for everyone, and anyone who undertakes it should surely know how to swim!

On arrival at Aligbay Island, lots of children greeted us on the beach. Lots of Banka boats were there too, their dredge nets out of

service due to the rough seas. My guide has a supplier he always stays with, so that is where I stayed. It was quite a nice home as nepa huts go! Four rooms and a kitchen, all built of bamboo and the local hardwood. I finished that long day enjoying a beer and local fish and vegetables with my guide and some new fishermen friends.

After eating, we looked at many fine sea shells. I decided to have a rum and coke. Nice idea, but I was forgetting some things: power only runs three hours a day to supply refrigeration, and then there is the local water and ice — big mistake! Well, I had medicine for that!

Fishing starts at 5 AM, and by 1 PM the next day, I was on my way back to Dumaguete direct in a large, 10 meter Banka that I rented to cut out the round-about travel. Again, I was well-pounded and soaked by rough seas for about two hours. My boat driver said he could not make it the last 4 kilometers to town, and asked if I would be willing to take a jeepney into town. I adjusted the price down, he dropped me off in an unknown village, and, soaking wet, I set out to find the highway. I caught a minibus/jeepney which seemed intent on a death race with other drivers to grab the next passenger! Quite a competition! Once in Dumaguete City, I walked to a nice waterfront hotel, ordered a meal, changed into dry clothes, and waited for the SuperCat to take me back to Cebu City.

Some rare species of shells being found off Aligbay Island include: *Bolma bartschi, Bursa condita, Calliostoma toshiharui, Cancellaria macrospira, Cancellaria thysthion, Conus chiangi, Cypraea beali, Cypraea queenslandica, Daphnella itonis, Epitonium brunnea, Epitonium garciae, Epitonium okezoko, Glyphostoma otohostoma , Latiaxis sugitanii, Mitra cloveri, Mitra gilbertsoni, Mirta hayashi. Mitra suduirauti, Mitra vicmanoui, Morum watsoni, Oliva vicdani, Terebra stearnsi, Terebra raybaudi, Terebra vicdani, Typhis pavlova, Typhis boucheti, Trivia eos, Trivia opalina, Trivia sibogae* and many new and unnamed species.

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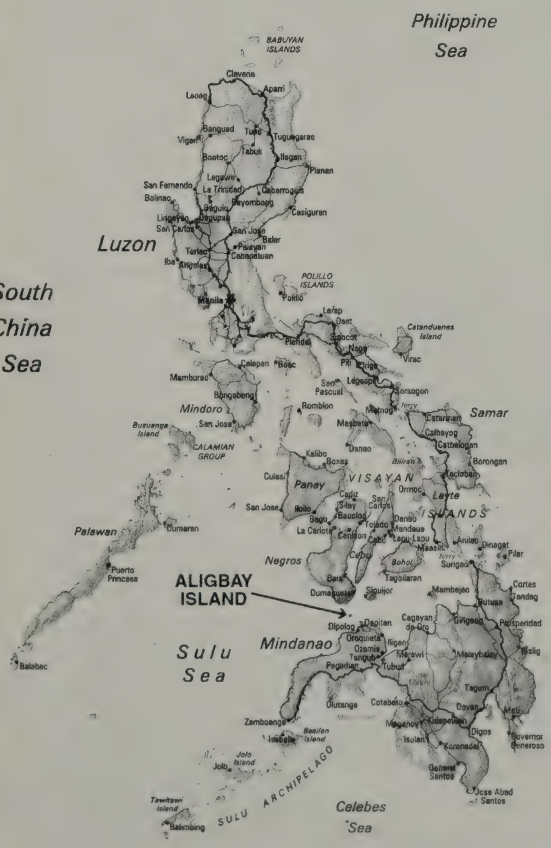


From top to bottom: a Banka boat for dredging, children greeting the author on the beach and at bottom, the author packing his bounty.

COA BOOK REVIEW

Redfern, Colin. 2001. Bahamian Seashells; 1000 Shells from Abaco, Bahamas. *Privately published, Boca Raton, Florida. Available from: Bahamianseashells.com,, Inc., 21218 St. Andrews Blvd. #647, Boca Raton, FL 33433. Paperbound. Price $114.*

This is the book people wanted me to write, which I intended to write, and which I did not write. Very ably, Colin Redfern (one of my original co-authors) stepped into the breach and has published one of the best scholarly "shell books" for any tropical marine area in the world. He treats all groups of mollusks, but only two cephalopod species. Perhaps surprisingly, nudibranchs ("seashells" ?) are included.

Except for a few type specimens, the nearly 108,000 specimens on which the book was based were collected by the author over a period of more than 30 years –a real labor of love! He collected at the island of Abaco exclusively. This is the northeasternmost island in the Bahamas. Pleurotomariids are excluded because none from Abaco were available to Redfern (i.e., he did not have access to a submersible). The good shell descriptions, maximum sizes and illustrations are therefore all based on Abaconian specimens. Occurrences and abundances at other islands in the Bahamas and elsewhere are not given because these were considered beyond the scope of the book. None of the "Bahamian" species appears endemic, and some of these range from Cape Hatteras and Bermuda south to southern Brazil i.e. throughout the Tropical Western Atlantic Faunal Province. Type localities are also omitted, but there is a good summary statement on zoogeography low on the outside back cover.

Habitat destruction is much more serious than individual killings, but with a good conservation ethic Redfern was reluctant to kill any animals unnecessarily. Thus he beach collected or acquired many of the specimens while he waded or snorkeled. He carefully picked out many of the shells from large quantities of "quality" beach drift. He also dredged specimens and obtained some in grabs (bottom samplers). A crabtrap yielded specimens from the greatest depth: 295 m.

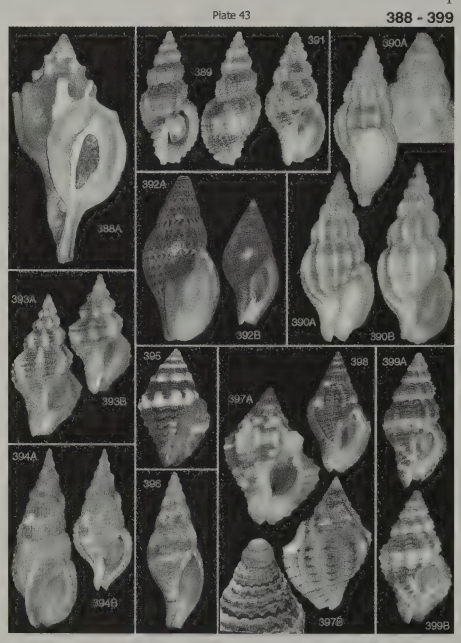
The illustrations comprise more than half the bulk of the book. There are 124 plates, 18 of them in color. The very many shells illustrated in black and white or in color are in surprisingly good condition considering that most were not collected alive. The photos even of tiny shells and also the printing are uniformly excellent. Some 75 crisp and clear SEM micrographs of tiny shells or parts thereof were prepared and provided by Dr. Emilio Rolán (shells were sent by mail to him in Spain). Unexpectedly, there are also many excellent photos of living nudibranchs and other mollusks with bodies extended, nearly all in color.

The systematic nomenclature is up-to-date. One could argue about a few things, but these are usually more matters of opinion than fact. Redfern himself co-authored some of the species from the Bahamas described and named recently. As was appropriate, no new species were introduced in this book. Synonyms are not mentioned and perhaps are not needed in a book of this kind, although exceptions could have been made for *Cerithium biminiense* and *Strombus samba*. Many common names are recorded or invented. Some of the new ones are simply the scientific names with letters rearranged or inverted.

An excellent cross-referencing system between the text and the plates has been devised (there are no text figures except maps). Each species treated in systematic order in the text is given a number sequentially, and reference is made to the pertinent plate number (with an indication of whether the illustration is in black and white or color). In the plate caption and on the plate the same species number as in the text is used (Abbott, 1974 did this too). Thus different "fig." numbers are not needed. If there is more than one illustration of a species (different views or different specimens) these are distinguished by terminal capital letters.

In the captions, references are made back to each text page number. Each illustration is placed on a page opposite its caption. A glossary, reference list and index complete the book and are all well done. I did not find a single misprint. Is perfection possible?

Bahamian Seashells will take its place among the best marine mollusk faunal manuals for the tropical western Atlantic: Warmke & Abbott, 1961; Abbott, 1974; Humfrey, 1975; de Jong & Coomans, 1988; Leal, 1991; Diaz & Puyana, 1994, and Rios, 1994. Considering the wide geographical ranges of many of the species they consider, advances in knowledge of one fauna improves that in the others.



It was not an intent of *Bahamian Seashells* to emphasize natural history or biology other than systematics, although original observations are included. For example, some gastropods were reported to live on and perhaps feed on a particular genus and species of (identified) alga. Sensibly, Redfern did not mingle what he saw with book "learning". He did not collect at night, and did not include living plankton and its contained heteropods and pteropods. Veligers and teleplanic larvae were not considered. Some protoconchs are illustrated.

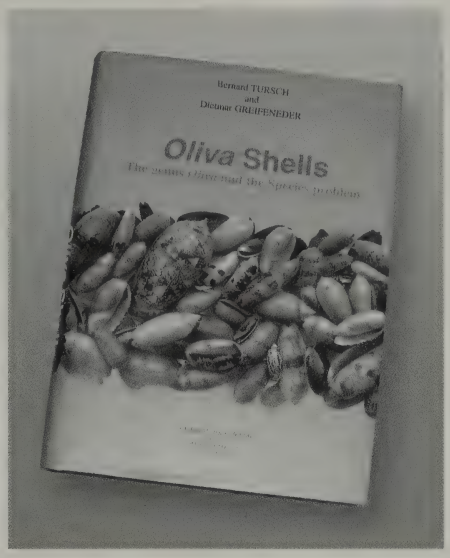
Robertson & Worsfold's Bahama work (nearing completion) is a technical supplement to the beginning of Redfern's book, much more heavily referenced and with greater emphasis on zoogeography, natural history and biology. Natural history enhances conchology ! Also, there is a more detailed and documented introduction, a key to and list of tropical western Atlantic faunal studies, a list of collectors in the Bahamas, and an expanded glossary. Thus the two books will complement each other.

–Robert Robertson, ANSP

Olive shells The genus* Oliva *and the species problem *by Bernard Tursch and Dietmar Greifeneder. L'Informatore Piceno, Italy and Bosque B. M. T., S. A., Costa Rica. pp. 1-569 (including numerous b&w plates, text photographs, & drawings) + x + 48 color plates. 215 x 296 mm. Hard-bound. ISBN 86070-17-9, 2000 (in English).*

Very seldom does any taxonomic monograph explicitly guide its reader through the basic philosophy and process which underpin any work of this sort. Yet Tursch and Griefeneder, in the course of providing an exhaustive

account of the biology and taxonomy of this important gastropod genus, have exploited their study as a heuristic model with far wider applicability – and they've done so in a uniquely captivating, illuminating, and user-friendly manner. The text of this *magnum opus* spans 469 pages, divided into 15 chapters. The stamp and tone of the work is set in the first paragraph of page 1, which outlines the seminal importance of the *Oliva* as a study group. The style – boldface passages, itemized "bullets," and simplified vocabulary – leaps out and invites the reader to share the opportunities and challenges faced by the authors, who actually seem to be having fun with this project.



No less than 30,000 *Oliva* shells, including all available type material) were examined by the authors; 100,00 measurements were made on 3,000 shells, and definitive taxonomic criteria were painstakingly teased from these data by a mix of inductive and deductive massages – tempered by a (combined) half-century of their prodigious familiarity with many biological aspects of the group.

As the presentation progresses through the first three chapters, myriad topics – from basic human nature to the marginalization and denigration of taxonomy (dubbed the "queen and handmaiden of all other biological disciplines") in modern scientific society to dealing with the pratfalls of false assumptions, imprecision, convergences, illogic, (im)probability, to the disjunction of Linnean vs. evolutionary classification, to mention only a significant minority – are met with charming candor. Basic works by the likes of thinkers Stephen J. Gould, Ernst Mayr, Carl Sagan, Gaylord Simpson, and Edward O. Wilson are cited in the process. The style is often homespun (on environmental variation; "you have a nice suntan."), slightly impious (on nonscience: "we have a very high opinion of ourselves. Therefore many people still find it hard to swallow that *Homo sapiens* is not the pet project of the Mesopotamian high god Maduk or one of his junior synonyms"), acerbically logical (on the modern scientific community regarding gadgetry-unenriched taxonomy *demodé*: "then what about mathematics?"), but it is always illuminating.

Chapters 4 through 11 deal with collecting these animals, various aspects of their life history, shell structure, and coloration. The next two chapters treat the technical aspects of shell measurement and the careful dissection of the data thus obtained to exclude shell features imparted by a host of misleading forces (from collector bias to non-isometric growth to "adaptive " characters, etc.). Much of this work has been published in an extensive series of papers in the formal scientific literature over the last decade, but all this information is essential to understanding the classification that follows. The taxonomic treatment of constituent species takes up most of chapter 14. Taxa are grouped into 16 species groups (to aide in identification only; not necessarily with taxonomic rigor). Each taxon is presented by its scientific name, author, date, report of twelve formatted sets of shell characters which include the newly-defined "subchannel pattern," "cloak pattern," "plications plate," and "shoe." A diagnosis section differentiates the taxon from similar ones. Habitat characteristics are reported, and a distribution map is referenced. Those who haven't read earlier works by Tursch *et al.* (exemplified by their consolidation of the *O. fulgurator* complex in 1998) may be dumbstruck by the scant number of taxa recognized – only 74 – without use of subgenera and with nearly total abandonment of subspecies (only 5 for the 69 nominate species), each parsimony defended in earlier chapters. Only one new species, *Oliva fijiana*, is introduced. Given the authors' acknowledgment of a few less than 500 proposed names referable to Oliva, this gives a ratio of less than 1 in 6 of these as morphospecies meeting their criteria for validity.

The next section, sentimentally entitled "Le tombeau des *Oliva*," is an alphabetical list of each relevant species-level name (including various misspellings, etc.) which has appeared in the literature. Original reference, type material, synonymy, and various other random topics related to nomenclature and taxonomy are addressed name by name. Virtually all types are illustrated in the 29 black-and white type material plates, containing about 600 images, that immediately follow the listing. In many instances syntypes are shown without a designation of a lectotype.

At the back of the book are 48 color plates preceded by the extensive bibliography and followed by subject and systematic indices. These plates contain about 1000 crisp accurate images all told, at least a few for each species, in nearly the same sequence as the text treatment, and especially selected to depict variability (when appropriate). Some of the principles of shell coloration discussed in early chapters are shown in the first three of these; the last six feature living animals.

This work is both an original and trenchant primer in taxonomy, conveniently written in the idiom of conchology, *and* a beautifully-executed monograph which is as magnificent an iconography as one can imagine in the context of a scientific treatise. Very few shell-collectors (who can afford it) should pass this by. For those who are still skeptical or especially frugal, we reiterate the dual value of the work as well as the number of pages and plates. This work is available for about 110 U. S. dollars from several booksellers.

— *Harry G. Lee*

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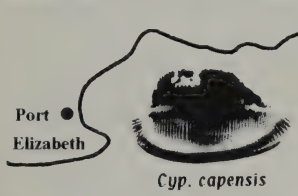

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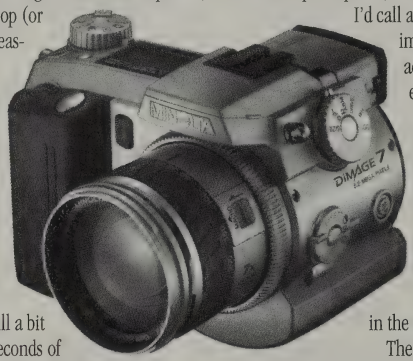
The Mystery of the Megapixel

by Jim Miller

As a professional photographer, I am often quizzed by those in the market for a digital camera: what's the best brand; how many megapixels do I really need? Well, for those of you about to enter the dizzying world of digital imaging: welcome to the future! While the 35mm format will certainly be with us for some time to come, the writing is clearly on the wall. Even some of the biggest names in photojournalism and top commercial photographers — people who can afford to own any camera they choose — are switching to digital. And for good reason. Now there's no need to wait for photoprocessing or keep bad exposures; virtually all digital cameras allow you to review each shot and delete those that don't please you.

Back in the "old days," photographers had to bracket their important shots, shooting one exposure at least one-half stop over and one at least one-half stop under exposed, along with whatever their meter told them was the "correct" exposure. Some perfectionists would do 4-5 exposures of a particular shot just to be absolutely certain they had something that was as close to perfect as possible.

These days, even if a particular shot taken with a digital doesn't look perfect, you can open it up in a program like Adobe Photoshop (or for a lot less money, Adobe PhotoShop Elements) and easily correct the exposure right on your personal computers. Even shots that are a bit blurry can be made useable with processes like "unsharp mask."



The only down side that continues to somewhat plague all digital cameras is the lag time between when the shutter release button is pushed and the photo is actually taken. While even 35mm owners had to contend with having to wait for their flashes to recharge, they could get instant exposures in outdoor situations. The latest generations of digitals are still in the 1/2 to one second range, which often is still a bit frustrating, though light years better than the 2-3 seconds of some older digitals. The workaround for this is to use burst mode. Here you press the shutter button just slightly ahead of the action and the camera takes a fast series of exposures in a row. That way, odds are good that one of them will me "on the money."

To those of us who shoot a lot of shell photos (or still lifes or other non-action subjects), that miniscule lag becomes less important. What's more, you actually begin to anticipate the shot and press the shutter button ahead of time, knowing there will be a brief lag while the camera sets the correct exposure and autofocus (though, of course, there is no actual shutter in digitals, it's just a term that hangs on from 35mm days).

But let's jump back to our main topic: Which cameras are best and how many megapixels (MP) do you need. What you want to look for — and this is assuming you will want to be shooting photos of shells as well as little Timmy's birthday party — is the ability to focus close. These days, almost all digitals above the most basic models have a close-up or macro mode. Some, like the Nikon Coolpix 990 and 995 can focus as close as 2cm or so from the front of the lens (or just over 1/2 inch). Other cameras, like the new Minolta Dimage 7, depend on the telephoto lens to get "close in and personal." In selecting your camera, you decide just how small a subject you will actually be photographing. In the case of the Nikons, you can get near frame-filling shots of subjects as small as 1/2 inch, others can't get this close. Check the specs closely or get a demo. Many digitals will even produce acceptable exposures of macro subjects with the built-in flash, though perfectionists will want to at least add a slave strobe to eliminate the harsh shadows cast by onboard flashes.

Naturally look for features you think you might actually use. A minimal zoom to look for is 3X (or three power) with further digital zooming capabilities. Beyond that, do you want a camera that can capture a short movie? How about a long burst of exposures? Do you want sound capabilities? How about auto bracketing? It is beyond the scope of this brief article to explain what all these modes mean and what they can do for you. Rule-of-thumb is if you don't know what it is, odds are you probably don't need it. Naturally, if you end up with a camera with extra features, you may find yourself using them as you become familiar with them.

Two particular cameras that I have worked extensively with personally are the 2MP (two megapixel) Epson 850Z and the 3MP Nikon Coolpix 990. Those of you who have the June issue of *American Conchologist* close at hand may want to look at the cover of that issue which was shot using the Epson (as were the other images in my Sea of Cortez article). There are newer models in the Epson line, but I'm certain they have kept the basic feature set which is very user friendly. The 3MP Nikon is a step up with slightly better lens (Nikon is famous for its optics) and closer focusing, though it is naturally more expensive than the Epson and boasts many features that I have never used. Still, it is far less user friendly.

Since we're (at last) on the subject of megapixels, you'll want to consider this: the more pixels, the larger image you can print. A minimum of 2MP is required for razor sharp 4x6 prints, though 5x7s are quite good and 8x10s in the range of what I'd call acceptable quality. A 3MP camera is capable of producing images of excellent quality to about 6x9 and better than acceptable quality at 8x10. Some of the newest 5MP cameras like the Minolta Dimage 7 boast excellent 11x14 prints with acceptable results up to 16x20.

You have to ask what are your average applications. Standard album size photos are 4x6 and all 2MP and higher digitals can produce glorious results at that size. If you are going to be e-mailing images to friends, even the one megapixel digitals are quite capable of delivering excellent results since computer monitors use a resolution of 72 pixels per inch. Quality photo prints will run in the range of 200-300 pixels per inch (ppi).

There is a wonderful solution for getting great results from lower megapixel images by a company called the Altamira Group called Genuine Fractals. Essentially (without getting too technical), this program uses digital voodoo to expand a lower resolution photo into one that can produce excellent results as large as 8x10. Again, looking at the cover of the July issue, you'll note that the cover was processed by this software to make absolutely certain that the 2MP original would produce a quality 8 1/2 x 11 cover shot. An LE copy of the program sells for less than $50 and is even included with the Nikon. You can download a trial version from the company's web site at *www.altamira-group.com*.

You know the old saying: you can never be too rich, too thin or have too many megapixels. Still, excellent results are indeed within reach of 2MP cameras thanks to image enhancement software. The bottom line is to buy a camera that's as easy as you would like to operate, has the features you want (most notably close focusing capabilities) at a minimum of 2MP. From there it only gets easier to get excellent results, but more megapixels mean a bigger bite from your bank account.

One other caveat: a megapixel is not always a megapixel. By that I mean the number of pixels only gives you a rough idea of a camera's overall capabilities. There are hugely expensive cameras being built by companies like Canon and Nikon and sold to professionals that are only in the 2MP range. It's just that the advanced imaging hardware in these cameras will produce better results at 2MP than less expensive models boasting 3MP or more!

I hope in this brief (and most basic) feature I have helped point you in the right direction. Digital photography has come a long way from the first ridiculously expensive models with rather poor image quality to today's cameras that can go toe-to-toe with the best 35mm models available from any manufacturer. Digital photography is only going to get bigger and better and those who cling to their ancient roll-film cameras just may find themselves in the dust.

Shell of the Week

by Winston Barney

After more than 30 years of collecting and curating shells, I have recently been asking myself, "Why did I gather all these shells?" and "What will become of them when I'm gone?" The "Shell of the Week" project addresses both questions. I own shells that haven't been touched, perhaps not even eyed, in years. This project prompts me to open a few of those 180 drawers full of shells and actually *enjoy* my collection. At the same time, the project helps me prepare for the eventual disposal of the collection.

The essence of the project is to pick a shell, any shell, and give it special attention. After spending a few days studying the shell, I always get that great feeling of discovery, almost akin to finding a live shell. Moreover, I inevitably learn something during the search that applies to other shells in my collection.

I am well aware that if I study just one shell a week, it will take two years to study about a hundred different species. In fact, I have spent up to three weeks compiling data on a single species, due to an abundance of references being examined. Nevertheless, the time is well spent, the alternative being to keep stuffing shells in my cabinets and to never really know them, letting them languish, without love, until adoption by another well-intentioned owner.

Following is a list of activities that will provide you with hours of quality time amid your shells:

• Create a physical (not computerized) **file folder** for each "Shell of the Week," to contain the other activities related to this project.

• Create a **fact gathering form** leaving space for all pertinent ID characteristic that might be encountered. Separate forms are needed for gastropods, bivalves, and chitons. A typical form for gastropods might include space for the following information:

1. Systematic placement (class, order, subfamily, family, genus, subgenus, species)
2. Author, date, and name of publication containing the original description
3. Holotype and paratype data including type location
4. Common name(s)
5. Synonyms and their publication data
6. Etymology of species name and all synonyms
7. A bibliography of all references to this species in your library
8. Distribution
9. Habitat
10. Size
11. Shell characters:

build / profile	suture
texture / appearance	spiral sculpture
outer lip	axial sculpture
aperture	dorsal sculpture
posterior canal	ventral sculpture
anterior canal	periostracum
columella	pattern
parietal area	color
protoconch / teleconch	operculum
spire	other . . .
penultimate whorl	
body whorl	
shoulder	

12. Animal anatomy:

mantle	eyes and eye	foot
proboscis	tentacles	radula
siphons	stalks	

13. Reproduction notes
14. Observation notes
15. Top four ID characters (pick the four most important characters to point out on your drawings of the species).

The form I use consists of five pages. I leave about an inch of blank space between each heading, save it on the computer and print it anew each time I start working on another shell.

• Research the **author's biography**. I maintain a separate notebook for this purpose. Once you have your notes on Linnaeus, Röding, Lamarck, Reeve, Gmelin, Duclos, Swainson, and the Sowerbys, you'll have many of your shells covered and will have learned where to go for information about many others.

• Find all **references** to the species in your own library. Write the references on your form. Use the back or add pages if necessary. Devise your own system for identifying your books and periodicals, but be sure that you **include a key**, so someone else will know what you were thinking (and be able to use your notes to enhance your collection). Include in your reference notes the page numbers of any color photos (CP), black & white photos (BW), illustrations (I), photos of living animals (L), and maps (M).

If you have access to other libraries (municipal, college, museum) you will want to carry the collection of references to a higher plane. Members of shell clubs may decide to collaborate on the project and share resources and results among their members. If you collect shell stamps or shell coins you may want to include a list of stamps and coins that feature your species.

• As you read through each reference, **copy specific information** in the blanks on your form You'll find that "facts" vary greatly, especially regarding typical sizes and depths of habitat. But, even more important, one writer may mention something that all the others failed to observe. The more references examined, the more will be learned.

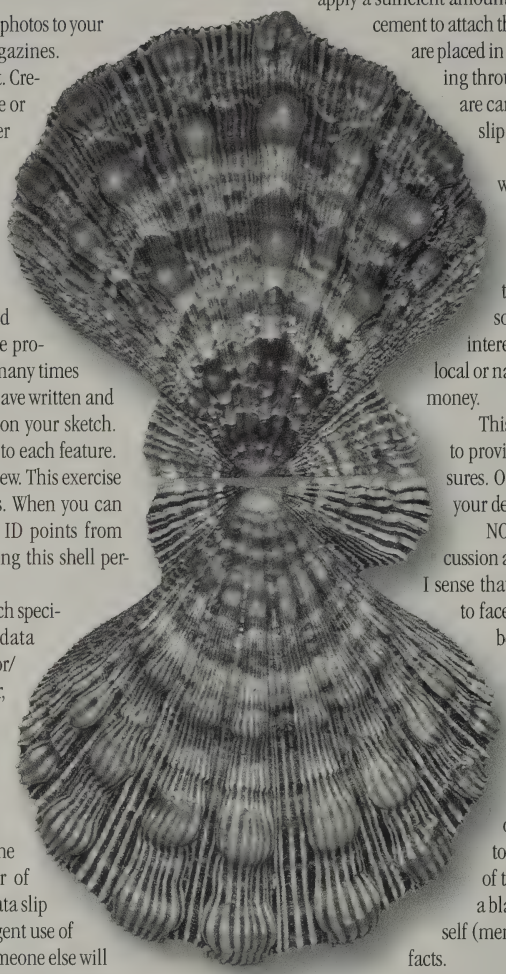
The point of this exercise is to gather **every** detail that pertains to this shell. I make photocopies or OCR copies of most of the references. References that consist of a simple list of shells found at "_____ Island," are written on a 3x5 card and tossed in the folder with the note "found at _____," and the reference name and page number.

• **Write a description of the species in your own words**, using the notes you have gathered. If using the computer for this, give careful thought to a system of naming your files. Delete any headings that don't apply (the families Olividae and Cypraeidae will need different headings from Muricidae or Strombidae). This will be your final analysis of the species, so compile the best info from all sources. This is a good place to list all the catalog numbers of this species in your collection.

• **Draw or copy a map** of the specific geographic area pertaining to your particular species. Devise a method to differentiate between your own specimens and those from the literature, then mark the map showing locations where the shell has been found. For example, a small square containing the number "1" might refer to example #1 from your collection list of catalog numbers (see above). A solid circle might indicate examples from the literature and numbered circle might be keyed to the list of references, especially periodicals (or 3x5 "found at . . ." cards).

— Continued on Page 22

Shell of the Week



• **Photograph** the shell and add the photos to your file. **Scan photos** from books or magazines. **Download JPEG files** from the Internet. Create a computer file folder on the hard drive or burn your own CD containing the computer images you collect. Make a list of the beautiful photos of the species that are found in "coffee table" shell books and large shell calendars.

• **Draw a freehand sketch** or use carbon paper to trace an outline of the species. Use shading to indicate curves and depth of field. This is a crucial step in the program. Spend some time and start over as many times as you need. Refer to the description you have written and locate the most important ID characters on your sketch. Now label them using an arrow pointing to each feature. If necessary, draw a dorsal and a ventral view. This exercise is the best way to get to know the species. When you can draw that shell outline and attach the ID points from memory, you'll be on your way to knowing this shell personally.

• **Print out new data slips** for each specimen or lot being studied. Minimum data should include family name, species, author/date, brief locality data, collection number, and number of specimens in that lot (notated: 2346-3 , meaning 3 specimens in lot # 2346). Insure that data slips are permanently associated with the appropriate shells.

For example, put the data slip inside the aperture or inside the closed container of shells. Never let a shell go wanting for a data slip or place the data slip in an open box. Diligent use of data slips is the only way to insure that someone else will know how to find out everything else there is to know about that shell. The data slip should always lead its reader back to a data base or notebook where more data is revealed. Now is a good time to **update the value** of your shell. Be realistic.

• **Clean and restore** (treat with your favorite solution) all shells of this species. Place the new data slip in the aperture of larger shells, and apply a sufficient amount of new cotton to keep it in place. Use rubber cement to attach the operculum to the new cotton. Smaller shells are placed in small ziploc bags with the new data slip showing through. Lots containing a large number of shells are can be stored in large freezer bags with one data slip (in its own ziploc bag).

• If you already know who will receive it when you're gone, **assign this shell to its future owner** now. Here are some suggestions:

Give it to someone you know who collects the same family and will welcome it. Give it to someone in your family who has expressed an interest in providing a home for it. Donate it to a local or national shell club that would auction it to raise money.

This is the *short* list. There are many other ways to provide for intelligent disposition of lifelong treasures. One thing is fairly certain: if you don't express your desires, in writing, they will seldom be realized.

NOTE: This topic is worthy of some intense discussion and planning by local and national shell clubs. I sense that many senior shell collectors are beginning to face the problem of finding new homes for their beloved shells. We need a National Shell Adoption Center!

• **Display the shell(s) in a prominent place** in the home, to be seen each day. Place with it the species folder containing its description, ID sketch, locality map, photos, and copies of articles. Inspect the shell once a day during the next week, attempting to recall all the main ID characters and as much of the auxiliary information as possible. Provide a blank fact form in the folder so you can test yourself (mentally fill in the blanks) daily on the pertinent facts.

• As you **reflect on each shell** ask yourself "Why did I collect this shell and what will happen to it when I'm gone?"

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Sarasota Offers Mote Masters Trophy

The Sarasota Shell Club is very pleased to announce the addition of a new level of competition at the **38th Annual Sarasota Shell Festival** to be held February 15-17, 2002 at the Muncipal Auditorium, 801 Tamiami Trail, Sarasota, Florida.

This new category is open to exhibitors who have won an American Museum of Natural History, Smithsonian National Museum of Natural History, Dupont, or Conchologist of America at any shell show. These exhibitors are eligible to enter their winning exhibit in "The Best of the Best" category. The winner of this category will receive the prestigious Mote Masters Trophy for Excellence in Marine Science, Education and Public Outreach. This large lexon trophy will be engraved with the winner's name and kept in the Sarasota Shell Club Exhibit in the Mysterious Mollusks Exhibit hall at Mote Marine Laboratory Aquarium. A smaller version of the trophy will given to the winner.

If you are interested in entering this new category contact Lynn Gaulin (*ShellHunter@att.net*), Show Chairman for an exhibit form. The cutoff date for registration is February 1, 2002.

Eleuthera

— *Continued from Page 5*

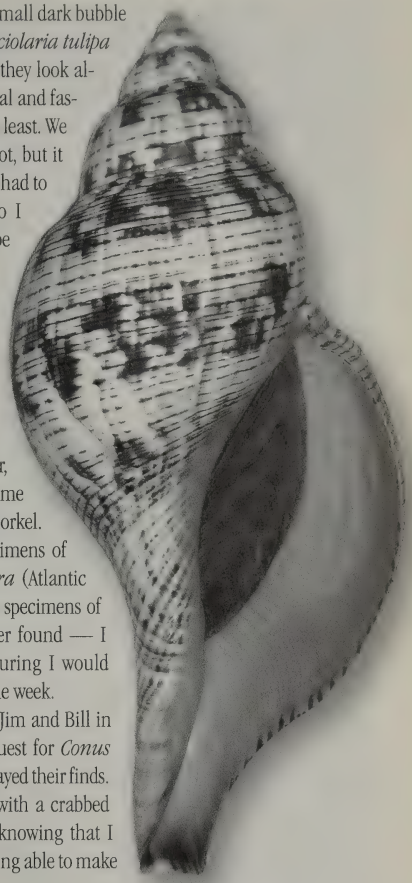
many gorgeous *Conus abbotti*. I would have loved to join them, but with my back problems there was no way I would survive a two mile walk across soft sand to reach the area they would be snorkeling in. Instead, the rest of us drove north to Governour's Harbour, an area that had a reputation for being loaded with dwarf Milk Conchs (*Strombus costatus*).

We had no more than walked down to the water when it became apparent that the stories were true: The shells were everywhere! You could have collected dozens without wading in water more than a foot deep! I kept picking up new specimens, only to discard a few I had dropped in my specimen bag only moments earlier. I decided to swim to an offshore island about a quarter mile away where, at a deep drop-off on the south side, I managed to snag a nice *Fasciolaria tulipa* (True Tulip); then I swam around to the north end where I found two *Charonia variegata* under ledges. Again, these were under eight inches and already quite rough, so I decided to leave them, in spite of their gorgeous apertures.

When I returned to shore, Margo had found another large, colorful tulip (the best of the trip), as well as two *Chicoreus florifer* (the only two we found at that particular spot). After a leisurely lunch (for shellers, that is), we drove back south to the famous Eleuthera salt pond, the only place in the world where the small black *Murex dunni* are found. I slipped into the shallow (and very warm) water. It took me a while to hit the right spot, but eventually I located a few choice specimens from among the hundreds present.

Black and white just doesn't do them justice: (Top) Tarpum Bay showing the view from right outside our cottages abd (bottom) Millar's Beach where we found so many wonderful shells.

The pond is also home to small dark bubble shells and dark, dwarf *Fasciolaria tulipa* (some so dark brown that they look almost black). It's an unusual and fascinating habitat, to say the least. We wanted to try one more spot, but it was getting late and Bobbi had to pick up Jim and Bill, so I hoped Tarpum Bay would be clear by that time.



Though not as choppy as the previous day, the water still looked quite murky, but once I was a little way out from shore the visibility improved to about 10 feet or so. However, the waves kept knocking me around and flooding my snorkel. While I did find two specimens of *Xenophora conchyliophora* (Atlantic Carrier Shell) — the first specimens of any *Xenophora* I had ever found — I headed back to shore figuring I would have better luck later in the week.

Bobbi returned with Jim and Bill in tow. Successful in their quest for *Conus abbotti,* they proudly displayed their finds. Jim kindly presented me with a crabbed specimen he had found, knowing that I was disappointed at not being able to make the trip to Winding Bay.

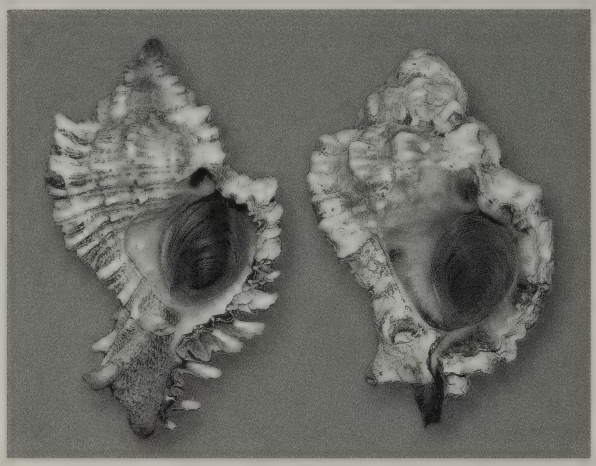
The following day turned out to be (for me at least) the best day of all. We drove once again to the southern part of the island, but this time turned towards the eastern edge — opposite from Cape Eleuthera — to a place dubbed Millar's Beach. The crystal clear water was so breathtaking that I could hardly wait to jump in. A small reef runs along the shore only a few yards out from the beach with lots of rocks to turn over, but I headed out into deeper water, hoping to find another large chank or perhaps a good specimen of *Charonia variegata*.

Though the Cordys had said that they hadn't found any helmet shells in this location with the exception of the smaller Flame Helmet (*Cassis flammea*), the habitat looked pretty promising, and soon I saw the distinctive triangular shape of a good-size *Cassis tuberosa* in about 15 feet. Not long after that, I swam over what appeared to be a fairly large, algae-covered rock. I almost passed it by as at this point I was almost in 20 feet of water, but I dove down and dug in the sand around it, thinking it might be a huge *C. tuberosa*. It took me several attempts to pry this shell out of the sand, but when I did, I saw it was an enormous *Cassis madagascariensis* over 13 inches long (though underwater everything looks a third larger, so it appeared gigantic — see page 4 for photo). I had thought that the large *C. madagascariensis* (dubbed form *spinella* or "Clench's Helmet") were found only in the United States, replaced in the Bahamas by the six to seven inch

— *Continued on page 24*

"typical" form. Even Abbott and Dance's *Compendium of Seashells* states the Southeast U.S. as the location for this form, but here in my hands, as big and heavy as a bowling ball, was, unquestionably, a "spinella."

With one large and one huge specimen of each Helmet Shell, I headed back to shore to drop off my finds. I decided to ask Anne if she wanted the *C. tuberosa* as we already had the two Margo had collected. When I found her a short distance down the opposite side of the beach checking the drift line, she enthusiastically accepted the shell. Bessie Cooke saw my big *C. madagascariensis*, and said she would love to have one like it for her new home, so I headed back out. Eventually fortunate enough to find a second huge specimen, I surprised Bessie with it later that evening. I also found a "normal" sized *madagascariensis* and a gem specimen just under four inches. Meanwhile, Margo continued her impressive string of finding *C. tuberosa* with what turned out to be the most outstanding of the trip — definitely another gem (see page 25).



(Top) A comparison of *Phyllonotus pomum* specimens from the Governour's Harbour area (left) and Cape Eleuthera (right). (Below) *Cittarium pica* in a wide variety of colors and patterns.

On our final full day in Eleuthera, we drove far north to a spot called Glass Window. Here a bridge spans the narrowest spot on the island with the waves crashing against huge cliffs on the open Atlantic side, spilling across the rocks below in what I can only describe as a tidal waterfall. On the protected western side, the water was indeed both smooth and clear as glass. We pulled the car well off the road, then made our way across the rocky landscape to the shallow water below.

At first I was a bit frustrated. Even though this looked like a great spot for shells, I wasn't finding anything of note. I explored for well over an hour, almost reaching the area of the "waterfall." I told myself to be patient and go back a lot more slowly, allowing myself time to more thoroughly inspect the rocky areas and some good-sized mussel beds. After about 15 minutes I was elated when I at last saw the distinctive shape of a *Chicoreus florifer* feeding on the mussels. For the next half hour or so, I searched every square inch of this spot and eventually found ten specimens of this beautiful murex, six of which I kept, though I did give Bill Simon one later (see photo page 5).

Okay, I was happy and ready to head back for some lunch (man, shelling does work up a big appetite), but I decided to make one last pass over this area in case some big *C. florifer* had eluded my aging eyes. Imagine my shock when instead of a *florifer,* I saw the unmistakable outline of a *Cymatium femorale* partially buried in the sand. I let out a "whoop!" through my snorkel that Margo heard all the way back at the car. I cradled my prize gently and in a euphoric daze, headed back to "base camp." Both Jim and Bobbi were pleasantly surprised at my find; though they have been shelling Eleuthera for many years, they have never found a *femorale* and were very happy for me, as this was only the second specimen I have ever found — and a gem one at that (see photo page 5)!

After a quick lunch, the five of us headed back south, looking for a new place to try. Eventually, we passed Governour's Harbour and came upon a spot a few miles farther on that looked good to us. Almost immediately upon entering the water I started to find a surprising number of *Fasciolaria tulipa*, some quite large. I also saw what had to be hundreds of the dwarf *Strombus costatus* and many juvenile chanks. In an open sandy area I saw a wide trail and dove down about ten feet to discover an absolutely gorgeous *Phyllonotus pomum*. Margo and I then sorted through all the Tulips we had found, eventually keeping the three nicest out of about a dozen.

To top off an already terrific day, Bill and I met outside our respective cottages at 10:30 that night and walked down to where the seawall met the rocky shore. There we plucked off some rather attractive specimens of *Cittarium pica*, the West Indian Top Shell. Though this shell gets to be about the size of a baseball, the locals obviously fish this area on a fairly regular basis, so our largest specimen was only about 65mm. Still, we ended up with a wonderful assortment of this species.

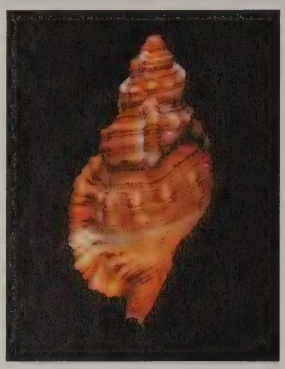
The following morning we finally had the perfect day to snorkel in Tarpum Bay. As we would be flying out that afternoon, we figured we didn't have a whole lot of time since we still had to pack up all our shells, but we did find another *Xenophora*, some Chestnut Latirus specimens and Bill found his first *Chicoreus florifer* as well as some nice marginellas. But the absolute highlight of the morning was the unexpected appearance of a graceful spotted Eagle Ray that swam by us several times. Usually these beautiful rays are rather skittish, so it was a real treat to have one afford us such a wonderful "close encounter."

As all good things must eventually end, we headed back to our cottages and got packed for the return flight to Fort Lauderdale. If anything, the flight home was even more fun than the flight over, probably because I now knew I had nothing to be afraid of. I even managed to get some wonderful aerial photos of the islands before we crossed the Gulf Stream and made our approach to the airport. We'd had a marvelous trip to Eleuthera that had surpassed our wildest expectations. What more could anyone hope for?

A) *Cassis tuberosa* from Cape Eleuthera,
B) *C. tuberosa* from Millar's Beach,
C) *C. madagascariensis* from Millar's Beach
and D) the dorsal side of specimen B.

E) *Turbinella angulata* from
reef on East side of Eleuthera

Caribbean Ranellidae



Cymatium aquatile (Reeve, 1844), 78 mm
50', under rocks at sewage outfall,
Hollywood, Florida

Cymatium cynocephalum (Lamarck, 1816), 83 mm
4', in turtlegrass, East Sister Rock,
Marathon, Florida

Cymatium ridleyi (E. A. Smith, 1890), 58 mm
300', in shell trap off Tryall, Jamaica

Cymatium femorale (Linne, 1758), 107 mm
15', in turtlegrass, Little Harbor, Abaco, Bahamas

Cymatium krebsii (Morch, 1877), 76 mm
210' by shrimper, Eastern Honduras

Cymatium martinianum (d'Orbigny, 1845), 73 mm
80', in rubble, at sewage outfall,
Hillsboro Beach, Florida

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Abbott, R. Tucker. 1974. *American Seashells, 2nd Edition.*
Beu, Alan G. 1998. *Indo-Pacific Ranellidae, Bursidae, and Personidae.*

By Kevan and Linda Sunderland, 9370 N.W. 39th Street, Sunrise, FL 33351, E-mail: *klshells@mindspring.com*

The intent of this feature is not necessarily to distinguish valid or invalid species, but to provide illustrations of taxa not always popularly available, for the information of the collector

Cymatium muricinum (Roding, 1798), 51 mm
2', under rubble, Grand Bahama Island, Bahamas
ex: Bob Quigley Collection

Cymatium nicobaricum (Roding, 1798), 68mm
3', under rocks, Port St. Lucie, Florida

Cymatium occidentale Clench & Turner, 1957, 29 mm
50', under rocks at sewage outfall,
Hollywood, Florida

Cymatium parthenopeum (von Salis, 1793), 87 mm
3', under rocks, Marathon Key, Florida Keys

Cymatium felipponei Ihering, 1907, 32 mm
300', by fisherman, Espirito Santo, Brazil

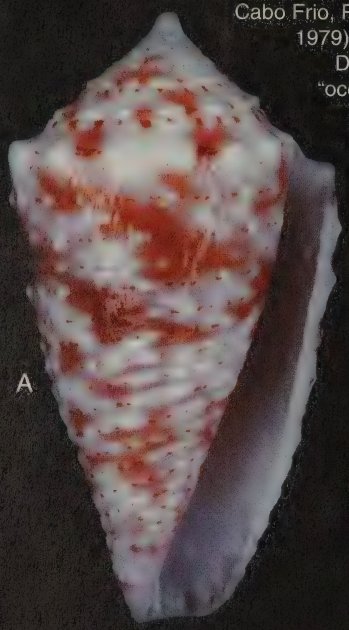
Cymatium (Linatella) caudata (Gmelin, 1791), 52 mm
100', by scallop boat, off Brevard County, Florida.
ex: Johnny Johnson Collection

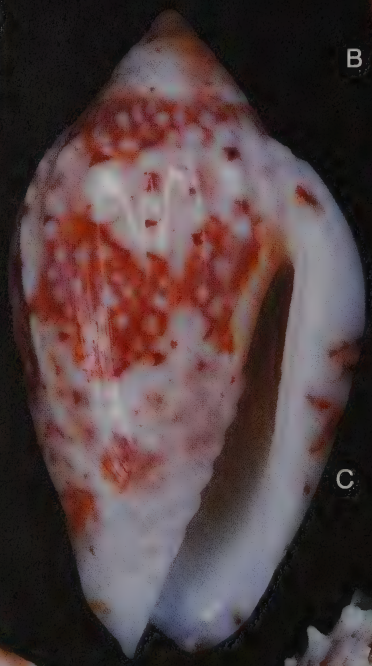
Redfern, Colin. 2001. *Bahamian Seashells, A Thousand Species from Abaco, Bahamas.*
Rosenberg, Gary. *Malacolog 2.01, an electronic database of Western Atlantic Gastropods.* URL: *gopher://erato.acnatsci.org:70/.wasp*

Discovering Offshore Surprises

— Continued from Page 6

KEY: A) *Conus cf. jaspideus* (Gmelin, 1791), 70km off Alcobaça; B) *C. aff. pusilius* (Lamarck, 1811) 14.6mm, off Cabo Frio, Rio de Janiero; C) *Plicoliva zelindae*, (Petuch, 1979) 14mm, 70km off Abrolhos Archipelago; D) *Columbella mercatoria* (L., 1758), "oceanic form" and E) *Chione cancellata* (L., 1767) 28mm, both from 70km off Alcobaça, Bahia State, Brasil.





Photos by Marcus Coltro

Purple Passion

THE OLD **SHELL GAME**
by Paul Monfils

The poop was beaten gold;
Purple the sails, and so perfumed that the winds
were love-sick with them;
The oars were silver....

Thus did Shakespeare describe the spectacular vessel in which Cleopatra sailed to meet Antony and destiny; and thus did he highlight one of the great loves of antiquity — that of royalty for the hypobranchial secretions of gastropods. For the substance which produced the splendorous shade of Cleopatra's sails, and which served as a mark of wealth and lavish opulence throughout much of antiquity, was manufactured from glandular exudates of marine snails of the family Muricidae.

Production of Tyrian Purple is particularly associated with the Phoenician city of Tyre (now the town of Sur in southern Lebanon), from which the dye received its name. Indeed, so vital was this commodity to the Phoenician economy that *Murex (Bolinus) brandaris*, one of the principle sources of the legendary dyestuff, was depicted on its coinage for more than 600 years.

The earliest direct evidence of man's first large-scale chemical industry, however, comes from archaeological digs in Crete, dated about 1700 BC. A cuneiform tablet in the British Museum, from the 7th century BC, bears the earliest known instructions for the preparation of molluscan dye.

Photo by Paul Monfils

Major ancient dyeworks have been discovered in more than thirty locations, on European, Asian and African shores of the Mediterranean, each utilizing some combination of the three principle dye-producing species – *Murex brandaris*, *Murex (Hexaplex) trunculus*, and *Thais (Stramonita) haemastoma*; however the Phoenicians guarded the details of their production techniques carefully, and purples produced by other cultures (often under alternate names — Royal Purple, Byzantium Purple, Imperial Purple, etc.) rarely matched the breathtaking hue of the genuine Tyrian product.

Seeking new sources of Murex as nearby populations became depleted, the Phoenecians journeyed widely, setting up dyeworks in remote locales. The Romans explored northward to the British Isles, making use of local molluscan species as sources of the coveted dye. Most notable were the northwestern European operations using the common dogwinkle, *Nucella lapillus*, as a resource.

The imperial dyeworks of Tyre were finally destroyed by the Arabs, during an invasion in 638 AD. The Romans continued the practice, but with the gradual decline of the empire, the use of the dye also declined, and large-scale production ceased with the fall of Constantinople in 1453. The pigment was replaced by cheaper dyes of botanical origin, like madder, indigo, and lichen purple. However, research suggests that the ancient Roman formula continued to be used in Britain long after it was lost in the Mediterranean area, with a *Nucella*-based industry continuing until the mid-nineteenth century, though on a far smaller scale than the great dyeworks of antiquity. Even in the early twentieth century, an ink made from *Nucella* secretions was used as an indelible laundry marker in both northwestern Europe and northeastern North America.

The color of such pigments is remarkably stable, resisting alkalis, soaps, and most acids. It is insoluble in most organic solvents, including dry cleaning fluids, and is reported to be unaffected by three to four days in a strong bleach solution. Similar inks were used sporadically in medieval calligraphy and decorative artwork, and their brilliant hues can be seen on a number of early English, Irish, and French manuscripts. Molluscan purple ink was also used on the parchments of the codices of Byzantium. When Alexander the Great conquered Persia in the fourth century, one of the great treasures he seized from King Darius as spoils of war was five thousand pounds of Tyrian purple cloth, still brilliant after 100 to 150 years in storage. Indeed, purple-dyed wrappings on mummies in some museum collections still show bright coloration after thousands of years.

Julius Pollux, writing in the second century AD, credited the discovery of molluscan dye to Hercules, who observed that the mouth of his dog was brightly stained after it had eaten snails on the seashore. Hercules subsequently fashioned a resplendent robe of purple, and presented it to King Phoenix, who declared that Phoenician rulers would thereafter wear the color as a symbol of their exalted position.

More probably, the intense staining of hands and clothing, which many shell collectors have experienced after picking up living muricids, could hardly have been overlooked by even the most primitive peoples of coastal regions. It is likely therefore that, even in Neolithic times, humans utilized on a limited basis this natural source of pigment for the decoration of woven and leather goods and pottery.

It was only after the Phoenicians developed methods for large-scale extraction and dying that purple took its position beside gold as a virtually universal symbol of authority and regality. Babylonians used it to adorn their idols. Romans used purple dye extensively, for robes of high priests and princes, and for temple hangings — until about 60 AD, when Nero proclaimed that Royal Purple was thereafter reserved solely for the emperor's personal use, upon pain of death. Molluscan dye also figured prominently in early Judaism, whose scriptures describe the source and proper use of Tekhelet, a compound with bluer tones than the Tyrian dye, commonly known as Biblical Blue, and traditionally prepared from secretions of *Murex trunculus*. The

— Continued on Page 30

Purple Passion

— *Continued from Page 29*

art of Tekhelet production seems to have been lost from Jewish culture by the eighth century, but was reinstituted in the late 19th century, through research into the original materials and methods.

Given the unique mystique of Tyrian purple, it is no surprise that it frequently found mention in literary works, usually in conjunction with royalty, or as an indicator of decadent opulence. Works of Virgil, Josephus, and Boethius mention the famous fabric, as does the Urantia Book. Both Pliny and Aristotle described methods for the harvesting of Murex, and the production of colorant from them; and the latter author further indicated the value of the finished product as "ten to twenty times its weight in gold." In later works, we find the famous muricid hue making an appearance in Wallace's *Ben Hur*; Thoreau's *Cape Cod*; Byron's *Don Juan*; Cervantes' *Don Quixote*; Joyce's *Ulysses*; and the poetry of Wordsworth, Barbauld, Gray, and others.

As recently as the nineteenth century, Robert Browning penned, ". . . for who has not heard how Tyrian shells enclose the blue? That dye of dyes, whereof one drop works miracles, and coloured like Astarte's eyes?" In the Bible, purple fabric appears more than sixty times. The veil of the temple is so described, and was likely fashioned from Phoenician goods. The prophet Ezekial included the material in a list of fine riches . . . " emeralds, purple, embroidery, coral, and agate"; and Paul, writing six hundred years later, indicated that the industry was still extant by identifying the woman Lydia as "a dealer in purple goods."

Production of Tyrian Purple was an arduous task, and the amount of material obtainable from a single mollusk was miniscule – factors determining the value ascribed to the finished commodity. An estimated 8,500 to 10,000 snails were required to produce one gram of pure pigment (approximately four million mollusks per pound of dye powder). The Murex were generally caught in baited wicker traps, and could not be killed until just before the manufacturing process began, since the raw material rapidly deteriorated after removal from the animal.

It is not fully understood how the great number of living snails required for a batch of dye could have been made simultaneously available, but archaeologists have discovered walled-off inlets on some rocky coasts, which they propose may have served as holding pens, in which the snails were kept alive until a sufficient number had been amassed. The production process itself was complex and time-consuming. The description provided by Pliny, in his mid-first century classic Natural History, covers the principle points quite well:

"The vein already mentioned is then extracted, and about a sextarius of salt is added to each hundred pounds of material. It should be soaked for three days, for the fresher the extract, the more powerful the dye, then boiled in a leaden vessel. Next, five hundred pounds of dyestuff, diluted with an amphora of water, are subjected to an even and moderate heat by placing the vessels in a flue communicating with a distant furnace. Meanwhile, the flesh which necessarily adheres to the veins is skimmed off and a test is made about the tenth day by steeping a well-washed fleece in the liquefied contents of one of the vessels. The liquid is then heated till the colour answers to expectations."

The "vein" Pliny alluded to is the hypobranchial gland, a small, saclike organ located on the roof of the mantle cavity. The structure secretes mucus which aids in the animal's locomotion, while concurrently trapping and sweeping away sand grains and other potential irritants. In certain predatory mollusks the same organ also produces substances with neurotoxic and/or anesthetic properties, which presumably play a role in subduing prey. Many collectors who have been "purpled" by a living specimen report a tingling or stinging sensation, often followed by some transient numbness of the affected skin area.

The substances involved in human dye manufacture are associated with, or identical to, these specialized secretions. The contents of the hypobranchial gland in such mollusks is usually a viscid, off-white fluid, which must undergo a series of chemical reactions before finally generating the vivid hue for which it is renowned. This fact suggests that the color itself is not of practical value to the animal, but rather, like the color of human blood, is an irrelevant property of a substance whose value lies in its other characteristics. Exposure of the concentrated exudate to oxygen and sunlight can trigger the reactive sequence. William Cole, writing in 1685, related the current method (in England) of producing dye from *Nucella lapillus*. After recounting the excision of the "white vein," in much the same terms as Pliny, he offered a description of the gradual color tranformation. He states that the hypobranchial contents:

". . . if placed in the sun will change into the following colours, i.e., if in the winter about noon, if in the summer an hour or two after sunrise and so much before setting (for in the heat of the day the colours will come on so fast, that the uccession of each colour will scarce be distinguishable) next to the first light green will appear a deep green; and in a few minutes this will change into a dull sea green; after which, in a few minutes more, it will alter into a watchet blue; from that in a little more time it will be purplish red; after which, lying an hour or two (supposing the sun still shining) it will be of a very deep purple red; beyond which the sun can do no more."

In the Mexican state of Oaxaca, the Zapotec people have long used muricid purple to dye their yarns for weaving. The intertidal, rock-dwelling *Purpura pansa* is their source of pigment, and intricate weavings are produced by combining this dye with other natural colors obtained from moss, leaves, and cactus. Archaeologists of future centuries will not unearth vast deposits of discarded *Purpura* shells however, for the Zapotec approach to muricid dying is far more environmentally friendly than were Old World methods. The snail is removed from the rocks by hand, "milked" of its few drops of hypobranchial fluid by pressing inward on the operculum, and then returned to its natural habitat, to continue feeding, growing, and producing dye for future harvesting. Individual strands of yarn are dipped into the pooled secretions, then laid out to dry in the sun, during which time the purple color develops.

Human usage has engendered a substantial historical legacy for muricid purple, but muricids are not the only mollusks which produce such secretions. An unlikely assemblage of other gastropod families, including Epitoniidae (wentletraps), Janthinidae (purple sea snails), and Olividae (olive shells – at least some species) exhibit the trait.

Some species of Aplysiidae (sea hares) also emit a purple substance, but this is probably not analogous to muricid purple since sea hares are herbivores, having no need to anesthetize prey. Their "ink" is already purple before ejection, is present in much larger quantity than the dye of other gastropods, and is not as permanent, decomposing readily in bleach. Sea hares, which are rapid swimmers, appear to use their ink cloud as a diversionary tactic, like octopus, a behavior which has not been observed in any of the slow-moving dye producers.

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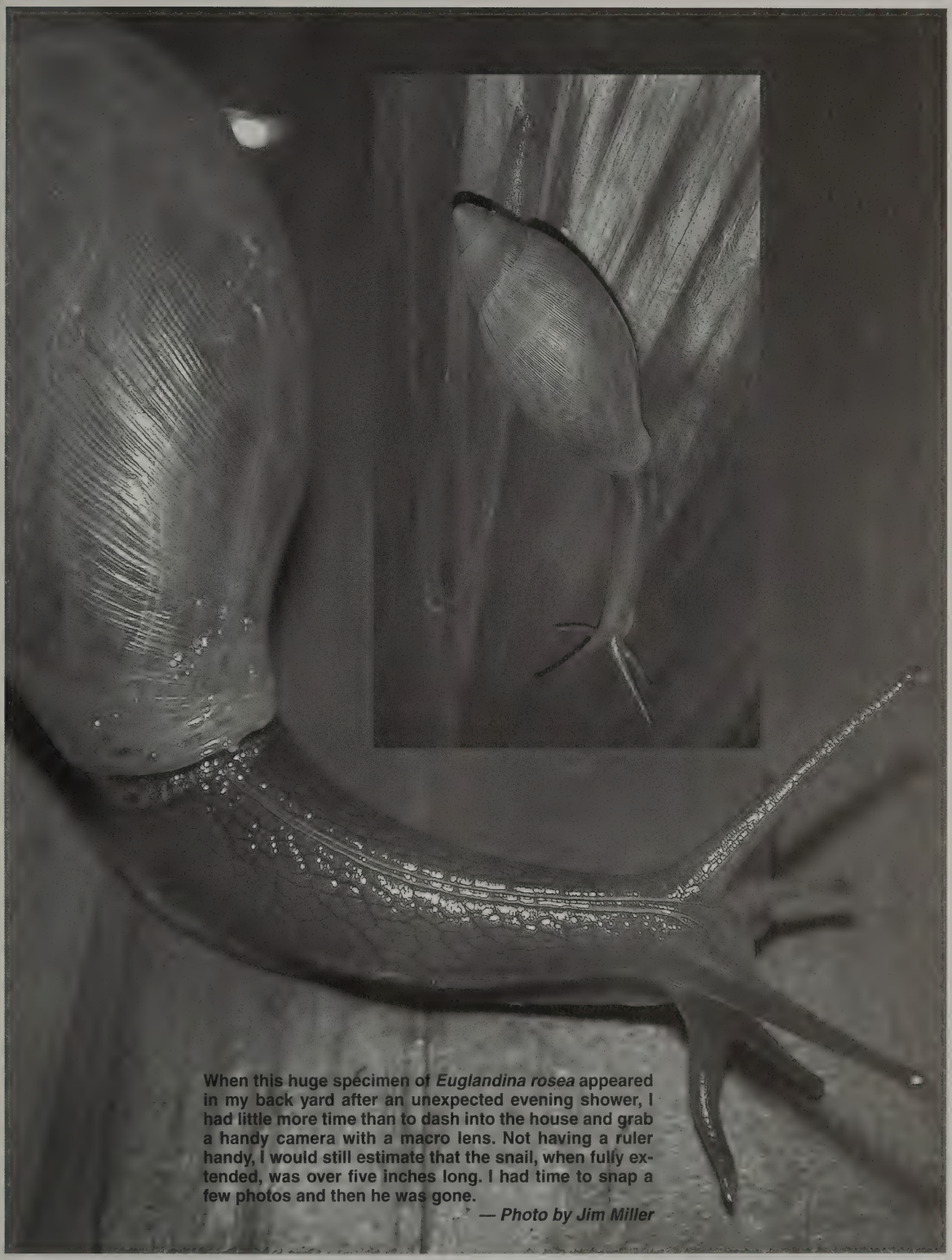

When this huge specimen of *Euglandina rosea* appeared in my back yard after an unexpected evening shower, I had little more time than to dash into the house and grab a handy camera with a macro lens. Not having a ruler handy, I would still estimate that the snail, when fully extended, was over five inches long. I had time to snap a few photos and then he was gone.

— Photo by Jim Miller

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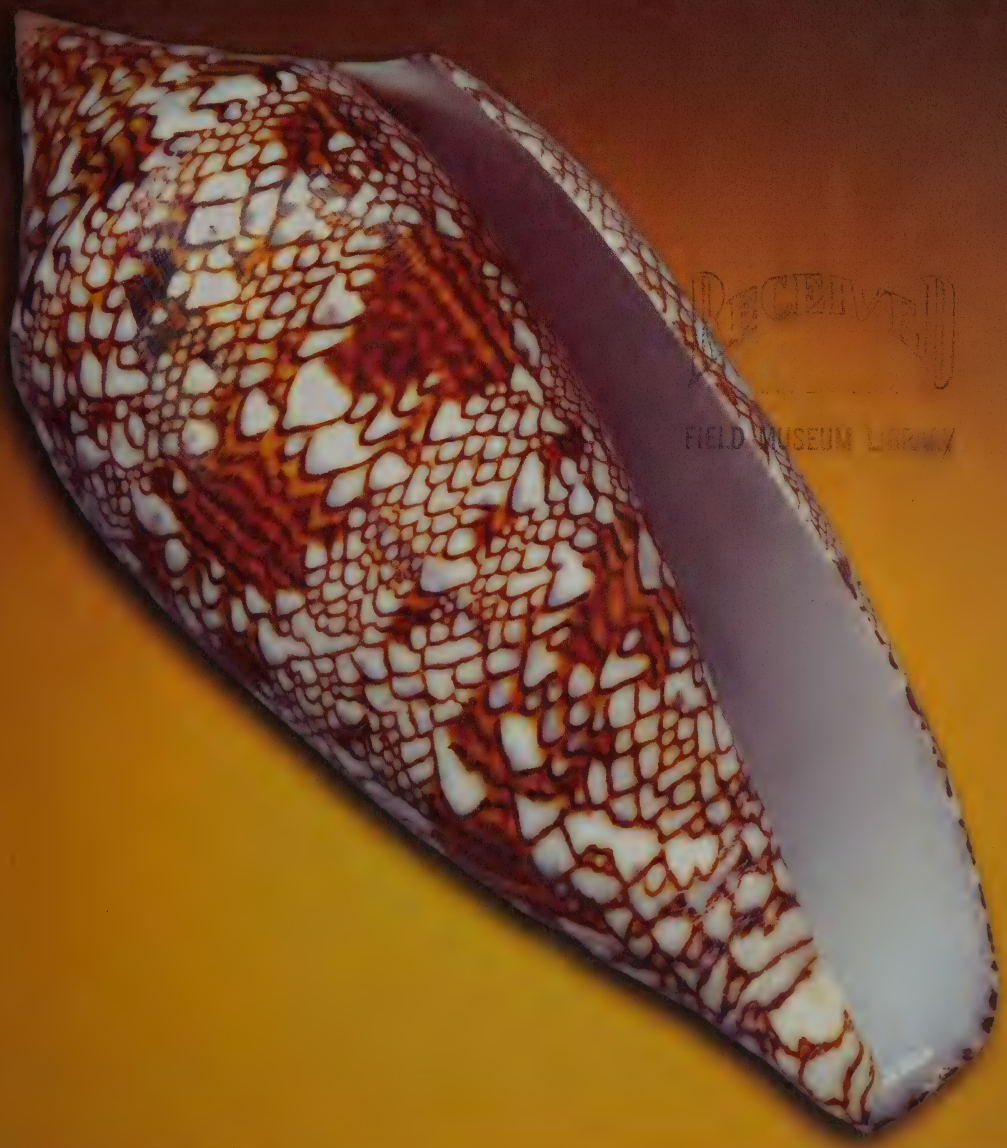

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CONCHOLOGISTS OF AMERICA, INC.

VOL. 30 No. 1 MARCH 2002

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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President's Message

It seems that only yesterday we were at the Convention in Cape Canaveral. I hope that all of you are looking forward to the 2002 convention in Sarasota. Please read more about it in this issue. COA has taken giant steps in the last few years, but our next steps are up to the membership.

For one thing, the magazine which you are now reading is not a magazine put out by a fancy publishing house to entertain the membership. It is a magazine in which the members may share their exciting interests in the hobby. Each member has something that he enjoys or knows about our hobby and the magazine is your opportunity to share it with the membership. The more input, the better the coverage of our topic! Many of you say, "But I don't know how to write." Well, you know how to speak! In fact, many of you are quite eloquent. Writing is simply putting the words that you would normally say onto paper. Put those words on paper and send them to Lynn. If your topic is suitable for the magazine, Lynn, as the editor, will work with you to make it suitable for publication.

COA does not hire a staff to publish this magazine. The editor is a member, just like you and me. She does the editing after she has worked all day at her own job, teaching high school English and French. Therefore, if she can do it, you and I cannot really say that we do not have time to write. Members of the editorial board also give of their time after their regular jobs, to read your articles and make suggestions for changes.

Also, if the material does not get to Lynn in a timely fashion, we cannot expect it to be included in the current issue. It takes about 4-6 weeks for the magazine to be edited, typeset and designed, and printed and mailed. Thus, deadlines for each issue are roughly 6 weeks prior to the month of publication. This means that articles for the next issue are due soon after the latest magazine hits your mailbox.

Betty Lipe

ABOUT THE COVERS

On the front cover: A dark textile cone (*Conus textile* Linnaeus, 1758), 69mm, dredged in 50 meters of water off Tuticorin, India, 2001. The shell is owned by **Tom Eichhorst** who scanned it for this month's cover with a Hewlett Packard 4400c Scanjet flatbed scanner. Cover design by Jim Miller. Be sure to check out the feature on tented Conus species by Bruce Neville (with excellent plates by Tom Eichhorst), plus an interview with Conus and conotoxin expert, Dr. Bruce Livett.

Our back cover is by **Mark Johnson**. It shows a Florida Fighting Conch (*Strombus alatus*) on the flats of Gullivan Bay popping out of the sand as the tide returns. Says Mark: "The interesting thing about the picture (to me, anyway) is the fact that two minutes before I took the photo there was absolutely no sign of a shell, only flat sand." While many of us have heard about – or even observed – this behavior, Mark's photo represents a classic case of being in the right place at the right time.

MOVING? MOVED? Be sure to send all **change of address notices** to the COA Membership Director, Doris Underwood. Don't miss a single issue!

"The Loveliest Smile"

The loveliest smile in all of COA is gone from our midst. RuthAnne Geary Sparlin passed away January 18, 2002 after a two year battle with cancer. And we shall miss her sorely! She is survived by her husband, Derry Sparlin, her mother, Ruth Narfi of Piedmont, California; three children: Ruth Geary of Oakland, California; Sharon Geary of Kailua, Oahu, Hawaii; and Bert Geary of Galveston, Texas and three step-children: Dean Sparlin of Springfield, Virginia; Lee Fankhauser of McAllen, Texas; and Louise Dickinson of Schenectady, New York. Treasuring RuthAnne as we do, we can only imagine what the grief of her family must be like, but we extend our warm condolences and our support.

COA member Lucy Clampit, who knew her well, said of RuthAnne, "The weird thing is that most of us really know very little about her personal life. When you talked with her, she was always asking so many questions about you that you never had a chance to find out anything about her. She was a great listener and seemed to be interested in everything…." RuthAnne loved people. She took such enthusiastic pleasure in the triumphs and pleasures of others that one forgot even to ask about her own. She took our griefs for her own too, commiserating in a way that made the hurt go away in the warmth of her aura!

RuthAnne Sparlin shares a happy moment with Jack Lightbourne.

But she had other enthusiasms as well: RuthAnne "loathed seeing cigarette butts thrown out of car windows," says her obituary, and she was a "staunch Republican turned liberal as her party took too much of a turn toward the far right." This writer would have guessed both! She was an impassioned woman who had strong ideas about justice, right and wrong, and fairness.

She loved travel and had visited over 65 countries. She collected friends everywhere she went. A trip to the Far East spawned a lengthy, photo-filled diary of places and faces that she shared with her friends. She was interested in the art, the history, the customs, and most of all, the people. Her home is filled with the gleanings of her many trips, every wall, surface, and corner bearing its mementos of some wonderful journey. Her home itself was like a travelogue. She'd take you through every inch, telling you the history and traditions behind this oriental statue or that wall hanging.

The most treasured of all her souvenirs was her second husband, Derry Dean Sparlin, whom she bagged while on a trip to China. Derry went everywhere with RuthAnne, supported her, made the greatness that was RuthAnne possible by his assistance, devotion, approval, and charm. He also nursed her through two long years of cancer therapy, surgery, ups, and finally downs.

She loved nature. She was an impassioned scuba diver, in pursuit of shells and color and adventure. Her post-trip travelogues featured the natural scenery and the unique features of each country she visited. This waterfall or that orchid earned RuthAnne's special coo of approval. Adored dogs and cats in abundance shared an honored place in her home.

A lover of color, RuthAnne often dressed like a tropical flower. Hot pinks, brilliant yellows and golds, turquoise, all the citrus shades suited her bright blond coloring and her joyful approach to life. A flower or a frilly bow complimented her every ensemble. When the chemotherapy for her cancer took her hair, she launched enthusiastically into color adventures with wigs — a blond braid, a platinum Dutch bob, a glamorous dark mane, a sparkling red flow of curls…RuthAnne looked great — and herself — in every one!

She loved shells and was a longtime and generous supporter of the Houston Conchology Society. Lucy Clampit said, "I don't even know how she got interested in shells." Nor did this writer. She was just suddenly there, in our midst, enthusiastically bidding and buying at COA auctions and Bourses, sailing about, her shell list in hand, consulting with dealers and fellow shellers about the best specimen, the prettiest color, the most interesting form. She had no specialty. She loved them all. In her collection, the rarities shared space with treasured beach specimens. She saw beauty in everything.

But Lucy learned that she discovered her enthusiasm for shells while in Hawaii on honeymoon with her first husband. The way Lucy tells it, "She collected a bunch of snails and put them in the bathtub in the hotel room. While they were away from the room, all of the snails crawled up the walls and left slimy trails. Someone told her to use Clorox, so she sent her new husband out in the middle of the night to buy Clorox. They put it in the bathtub with the snails. The Clorox caused the snails to deposit a lot of sand in the bottom of the bathtub. This was a new hotel, and they were the first people to use the room! After bagging up her shells the next morning, they quickly checked out, leaving behind a really big tip."

RuthAnne loved COA, and its large numbers of new people every year were her element! She burst on the scene in 1995 in Corpus Christi, buying all the shells in the auction, speaking out at the annual meeting, commenting on the board's lax observance of Robert's Rules of Order. Next thing we knew, she was Parliamentarian, lovingly but firmly keeping us all in line with her own brand of diplomacy. She gave generously to the organization and bought heavily at the Auction as another means of support for COA and its commitments to education. She befriended everyone she met.

People attending from foreign countries were especially appreciative of RuthAnne's attention and welcome. Maria Fontina Angioy, of *La Conchiglia* and Rome, Italy, said, "She was one of the first people I met when I attended my first COA. Maybe this is the reason why I have always had a special pleasure in meeting her. When a couple of years ago I attended COA without my husband and the kids, she felt that I could be lonely, and so she was particularly close to me. Even at the official closing dinner, she decided that I *had* to be with her at the table . . . and we had a lot of fun together."

Brian and Sharon Hayes of Port Elizabeth, South Africa, wrote: "When Brian and I came to Houston last year, RuthAnne was very generous and hospitable and took us for a drive through Houston and then to a shopping mall. She also took us to an Art Museum and out for lunch. We were really touched that she was prepared to take off a whole morning to show us around. We went home with her then for cool drink and met her husband, a really sweet man too."

If you were a member of RuthAnne's vast circle of friends and admirers, and should you wish to commemorate her life, perhaps you'd like to send a donation in her name to Cancer Counseling Inc., 4101 Greenbriar, Suite 317, Houston, Texas 77098 or to any charity of your choice that supports ovarian cancer research.

— Lynn Scheu

A New World's Record California *Latiaxis*

by Paul Kanner

To a shell collector, few things are as exciting as finding an outstanding specimen, particularly if the species is rare. I have been fortunate to have this happen a few times in my shelling adventures. On Saturday, January 20, 2002, it happened when I was not even looking for shells!

A couple of diving buddies had called to invite me to go lobster hunting. Saturday morning dawned clear and cold: air and water temperature were both a chilly 54 degrees. We launched my good friend, Dr. Andy Saxon's boat at Marina Del Rey Marina, California. Our destination was a small, submerged pipeline south of there. The pipeline runs directly out from shore near the Los Angeles International Airport runways. It is a very small pipeline, only about 2 feet in diameter and it's half-buried in sand. Though it is difficult to find, Andy's good marks enable us to get right on it.

We usually dive it at depths from 70 to about 110 feet. Because it runs out a mile or more from shore, we can put divers in different areas without covering the same territory. When lobster season is closed, I like diving the little pipeline for shells, but this time the focus was lobsters. I dropped down our marker line to the bottom in a little over 100 feet of water. Surprisingly, the visibility was good so I had no trouble seeing the outline of the pipe. I started swimming over it, following along towards shore.

Within minutes, I was able to bag four nice lobsters. Swimming rapidly about two feet above the pipe in order to cover as much area as possible, I passed over a small, dark lump stuck to the side of the pipe, but kept on travelling. I was looking for more lobsters to complete a bag limit of seven. I cannot say why, but something in my sheller's instinct made me turn back to investigate that dark little mass, and I'm sure glad I did. That lump on the pipe turned out to be a shell, completely encased in a thick brown sponge.

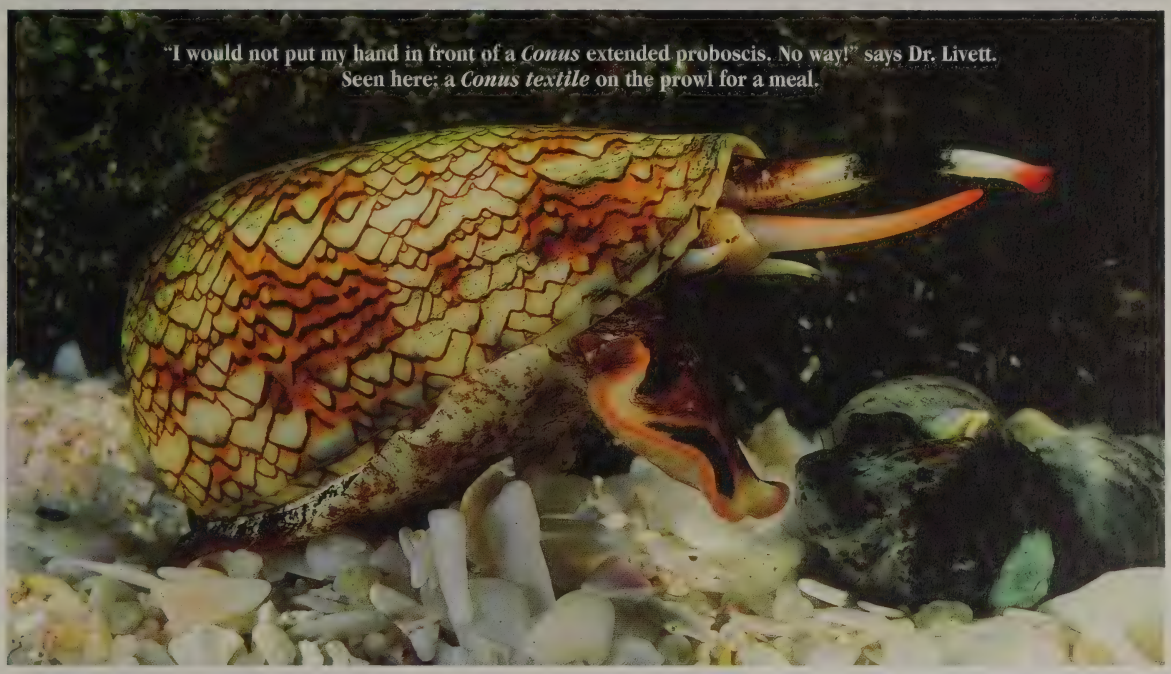
On further examination, it proved to be an extremely large specimen of *Latiaxis (Bableomurex) oldroydi* (Oldroyd, 1929). I was excited because this shell was much larger than any I had collected or seen before. I surfaced from my dive anxious to get back to the boat for a closer look at my prize. At that point, I could have cared less about lobsters.

Latiaxis oldroydi is not common and they are usually badly encrusted and eroded except for the very small, young specimens. I was certain that the sponge covering the shell had protected it from the usual damage and that it would clean up with a little bleach and scrubbing with a toothbrush, and it did — beautifully. The specimen measured 61.8 mm before cleaning and 61.5 mm after cleaning. I contacted Kim Hutsell, one of the editors of *Registry of World Records Shells*. Kim informed me that my specimen was 6 mm larger than the previous record and that it will be recorded in the next edition of the *Registry*.

The pipeline creates a unique environment in Santa Monica Bay. If you explore away from the pipe, very little life is evident. However, adjacent to the pipe marine life flourishes and mollusk life is abundant. It is one of my favorite areas to shell in Southern California. Huge *Bursa californica* and *Kelletia kelleti* patrol along the edge. Large colonies of *Megasurcula carpentariana* occur here. It is not a pretty dive but it certainly is interesting, because so much life exists and attaches to this man-made structure.

— Continued on page 31

An "Internet Interview" with Bruce Livett



"I would not put my hand in front of a *Conus* extended proboscis. No way!" says Dr. Livett. Seen here: a *Conus textile* on the prowl for a meal.

by Eduardo Moreira

You are a well-known researcher in *Conus* and conotoxins and I'm sure our readers are going to love to hear about you. Before that, please, tell us who is "Bruce Livett"?

Dr. Bruce Livett: I was born in Melbourne, Australia, in August, 1943 and graduated with a Ph.D. in biochemistry (neurochemistry) from Monash University. After a postdoctoral period in Pharmacology at Oxford, UK, I returned on staff to Monash for 5 years and then took a research and teaching appointment in Neurology and Biochemistry at Montreal General Hospital and McGill University, Montreal, Canada. After 6 years I returned again to Australia, this time to Melbourne University where I have been for the last 18 years in Biochemistry and Molecular Biology.

I am presently Reader and Deputy Head of Department. My research involves using the tools of modern biochemistry and molecular biology to discover novel conopeptide sequences, synthesize them and test their biological activity. I have been assisted on my field trips by family (my wife Dianne, son Andrew and daughter Erica) and by colleagues and student members of my laboratory. We have mostly collected on Lizard Island, North Queensland, but have also been on field trips to One Tree Island, Heron Island and Lady Elliott Island.

You are a neurochemist, but your research in conotoxins deals with shells. Can we call you a malacologist?

I have been a member of the Malacological Society of Australia for 5 years and recently attended the Molluscs2000 meeting in Sydney where I presented the accompanying paper on video observations of envenomation of prey by *Conus*. So I think you can call me a budding malacologist!

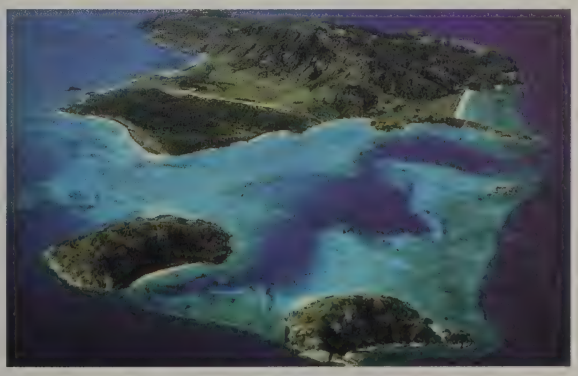
When and how did you get involved with shells?

My interest in molluscs is relatively recent. I became interested in *Conus* through reading the scientific articles of Baldomero 'Toto' Olivera and began collecting *Conus* 8 years ago on the Great Barrier Reef, Australia. More recently I have been collecting *Conus* from the southeastern waters of Australia. I have attended the National Shell Show in Melbourne (1999) and Adelaide (2000).

Who were your most inspiring mentors, and why?

- Baldomero 'Toto' Olivera, Utah (for introducing me to the fascinating biology of *Conus*).
- Jack Austin, Cowes, Victoria, Australia, who demonstrated by his keen interest in all matters malacological that shell collecting can be an lifelong pursuit.
- Jon-Paul Bingham, Queensland, (presently at Yale) who showed me the

— Continued on page 14



Fantastic aerial shot of Lizard Island, off the Australian coast and site of many of Dr. Livett's collecting trips. Photo used by permission of George Burnett of Queensland, Australia.

More Discoveries from a Collecting Expedition off the Louisiana Coast

by Emilio Fabián García

In the June, 1999 and September, 2000 issues of *American Conchologist*, I reported on some interesting molluscan findings in the northwestern Gulf of Mexico. In June, 2001 I was invited by Dr. Darryl Felder, a decapod (crabs, shrimps, lobsters) specialist from the University of Louisiana at Lafayette, and Dr. Suzanne Fredericq, a phycologist (algae) from the same institution, to join them for another collecting trip. Although we had only dredged in earlier expeditions, this one would be more encompassing. As was the case in the first trip, we used the R/V "Pelican," a research vessel operated by LUMCON (The Louisiana Universities Marine Consortium).

Surface waters from thirty states spill into the northern Gulf of Mexico by means of great river systems such as the Mississippi, Missouri, Ohio, Rio Grande, and others (Gore, 1992:63). These runoffs, together with those of Mexican river systems, constitute approximately two-thirds of the United States, and more than 50% of Mexico (Earle, 1972).

The nutritional sediment carried to the Gulf by these waters, together with the powerful current that enters the Gulf from the Caribbean Sea through the Yucatán Channel, has made this "American Mediterranean" an extremely rich and biodiverse body of water, a characteristic proven by the 334 species, representing 86 families, collected during the three day expedition. Of these, at least eight species had not been reported from the United States.

During the first portion of the trip trawling was done at four stations, from 20 m to 100 m deep, on mud bottom. Only 28 species, representing 20 families, were collected in the trawls. One dead specimen each of *Amaea mitchelli* (Dall, 1896) and *Conus armiger* Rehder & Abbott, 1951, were among the more interesting species, while *Amusium papyraceum* (Gabb, 1873) was the only abundant species collected alive in the deeper water. Later on, this seemingly poor ecological niche would demonstrate how important it is to choose the proper method of collecting for certain habitats if one wants to obtain a more accurate sample of their fauna.

The very first images of living specimens of *Mitra straminea* to appear in print. *Photos by Emilio García*

The second portion of the trip included dredging at nine stations. These dredgings were done at the top of the "pinnacle" areas which had shown such a rich biodiversity the year before. Also as before, an average of three 5-15 minute dredgings were done at each station at a depth from 54 to 92 meters. The bottom varied from hard, clean bottom in two stations, where the dredge came up empty, to unconsolidated calcareous rubble with various amounts of finer sediment. The finer sediment, when combined with rubble, proved to support the richest biota.

A total of 263 species, representing 80 families, were recorded from the "pinnacle" dredgings. Most of the species reported in earlier articles were found again, including an unusual color form of *Conus mindanus* f. agassizi (Dall), a very interesting taxon which deserves more attention than has been given. Unfortunately, the few specimens collected off the Louisiana coast have been empty shells.

As was the case in the earlier trip, *Turbo cailletii* and *Globivenus listeroides* were ubiquitous in the dredged material, in spite of the fact that the latter had not been reported from the Gulf of Mexico before our dredging operations began, and *T. cailletii* had only been reported from Alacrán Reef, in the southern Gulf of Mexico (Rice and Kornicker, 1962). From this area, 29 taxa are new records for the northwestern Gulf of Mexico (see sidebar on page 10).

Three of the four taxa described by de Jong and Coomans, and *Antillophos elegans*, had been reported only from the northern coast of South America. The fourth species, *Triphora elvirae*, and *Metaxia espinosai* had been reported only as far north as southern Cuba (Rolán and Fernández-Garcés, 1995).

Other species not previously reported from the Gulf of Mexico are *Teinostoma cocolitoris*, *Glyphoturris eritima*, *Teinostoma cocolitoris* and *Engina* sp. aff. *corinnae*. This latter species belongs to a group of forms which have been collected at several localities in east Florida and is morphologically closest to a form found in Bay Co., east Florida (Dr. Harry G. Lee, in litt., 10/3/01). The *Limatula* species was illustrated as "*Limatula subauriculata*" in *American Conchologist* 27(2):28 (June, 1999). It is referable to species 856 of Colin Redfern's *Bahamian Shells*, which seems to be an adolescent of this taxon.

Another 49 taxa, including an undescribed *Granulina*, could not be matched to any named taxa. *Triphora dupliniana* had been reported by Treece (1980) from the Yucatán area, but this locality had been questioned (Rosenberg, 2001). Although reported from Texas, at least 9 other species had not been recorded from off the Louisiana coast: *Limatula hendersoni* Olsson & McGinty, *Trivia suffusa* Gray, *Typhinellus*

From left to right: *Opalia burryi* Clench & Turner, 4.6 mm; *Vexillum hendersoni* (Dall), 13.6 mm; *Cycloscala cf. echinaticosta* (d'Orbigny), 5 mm and *Terebra mugridgeae* García, 9.4 mm. (Note: specimens are not to scale)

sowerbyi (Broderip), *Murexiella levicula* (Dall), *Fusinus couei* (Petit), *Morum dennisoni* (Reeve), *Rimosodaphne morra* (Dall), *Opalia burryi* Clench & Turner, and *Psilaxis krebsii* (Mørch).

One of the more interesting species caught alive was *Mitra straminea*. This species was collected in silty sand in 89-92 m, and became very active when placed in an aquarium for observation. Surprisingly, the animal was not white, as is the case in most *Mitra* species. The siphon and the upper portion of the foot are pale yellow, with milky-white, roundish dots of different sizes, the "dots" becoming very elongated when the animal stretches. The bottom of the foot is white. (See photos on previous page.)

Another very interesting surprise, although not collected alive, was an epitoniid that is very close to *Cycloscala echinaticosta* (d'Orbigny). The main differences between the two are that the Louisiana specimens have completely disjunct whorls, similar to the genus *Eccliseogyra*, and more numerous ribs. *C. echinaticosta* has not been reported from the northwestern Gulf.

Gem specimens of *Morum dennisoni* (Reeve), 37.7 and 36.3mm respectively.

The third portion of the trip did not show much promise. We were going back to the same muddy bottom that had produced so little by trawling. One of the postgraduate researchers who accompanied us was working on a group of decapods that burrow deep into the mud, and a 0.25 square meter box corer was going to be used to reach this habitat. The corer is a large metal box with an open bottom that is sent down to the bottom with such force that it penetrates the sediment deep enough to fill most of the box. As the winch begins to pull the box up, a mechanism closes the opening.

The box was used at four different stations, beginning at 52 meters deep and moving progressively into shallower waters at 22 meters. It was the shallowest station — with 60 species recorded — that was actually the most productive. These were taken out of a single box haul. The total result for the four stations was 77 species representing 31 families. Of these, *Chrysallida nioba* (Dall & Bartsch) was a new record for the Gulf of Mexico.

— Continued on page 10

New Findings on Brazilian Fresh Water Shells

by José Coltro Junior

For the last six months my crew have been traveling around Brazil, searching out new species of land and fresh water shells. Due to Brazil's extremely large size, it is poorly studied: the country has millions of square kilometers filled with utterly untouched virgin forests, unexplored by human beings!

Last August, Alex Bodart led three of my employees on an extended expedition from our home in São Paulo to the State of Acre, on the Bolivian border. They journeyed for over a month and a half, searching for shells.

They began their explorations in the State of Mato Grosso do Sul, in central Brazil, where they visited the largest wetland in the world — the Pantanal — over 140,000 square kilometers of lakes, marshes, swamp and dry land covering an area about the size of Great Britain! The Pantanal is one of the Earth's largest wild animal reserves as well; roaming free are millions of alligators (here they call them "jacaré") and the giant monitor lizard, as well as 650 species of wild birds including the emu, the rhea and the rare Hyacinth macaw. Such large mammals as the Giant River Otter, the Coati Mundi, the jaguar, the ocelot, the tapir and the capybara are all native here. The area boasts 260 species of freshwater fishes. If you like to fish, there is no better place in the world!

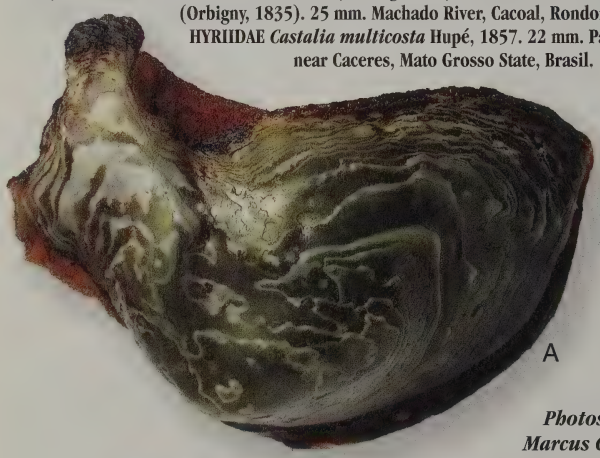
It was here that they found some interesting fresh water bivalves, among them especially the *Bartlettia gutmansi* (Lange de Morretes, 1941), an unusual bivalve that looks very much like an oyster, though it is a member of the family Etheriidae.

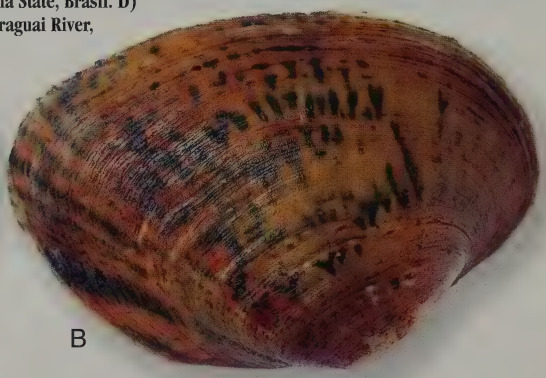
Another stop for the expedition was the Nioaque River region during the dry season. Here they were able to find many species in the families Mycetopodidae and Ampullariidade. In this area they went to visit Bonito, a beautiful natural reserve with extremely clear rivers where one can swim or dive among millions of fishes. In this calcareous area, it is possible to find many caves. The nicest is one they call the Blue Cave — a calcareous white cave with a beautiful blue lagoon.

Going north, they stopped at the city of Cáceres, in the State of Mato Grosso. This wildlife-rich region is the north range of the Pantanal, where

— Continued on page 9

A) ETHERIIDAE *Bartlettia gutmansi* (Lange de Morretes, 1941). 45 mm. Nioaque River, southern Nioaque, Mato Grosso do Sul State, Brasil. B) MYCETOPODIDAE *Haasica balzani* (Ihering, 1893). 35 mm. Near Nioaque, Mato Grosso do Sul, Brasil. C) HYRIIDAE *Diplodon charruanus* (Orbigny, 1835). 25 mm. Machado River, Cacoal, Rondonia State, Brasil. D) HYRIIDAE *Castalia multicosta* Hupé, 1857. 22 mm. Paraguai River, near Caceres, Mato Grosso State, Brasil.





Photos by Marcus Coltro

Brazilian Fresh Water Shells

— Continued from page 9

the Paraguay River starts to swamp the vast plain between Brazil and Paraguay. In Cáceres they found some interesting species, including a single specimen of the rarest Brazilian freshwater bivalve: *Leila castelnaudi* Hupé, 1857, a very inflated and elegant shell.

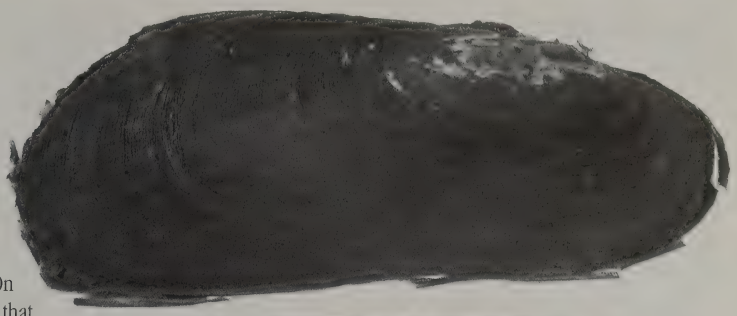
The Amazon forest begins to the north of Cáceres. On the way north to the State of Rondônia, our crew noted that most of the forest has been completely destroyed and transformed into farmland by soy or cotton farmers. Rondônia is in the western portion of the Amazonian basin near the Bolivian border. It was considered our "wild west" for many years. Unfortunately, more than 50% of the original Amazonian forest was completely burned or used to make furniture! Since 1990 the Brazilian government has been creating a large natural reserve here, providing more protection for the fragile environment.

Finally our expedition reached its ultimate destination, the state of Acre in the extreme southwest of Brazil, a state about the size of Iowa, almost 95% of which is covered by tropical (Amazonian) rainforest. Brazil bought this rubber-rich area from Bolivia in the beginning of the 20th century. The economy is traditionally based on rubber and on the harvesting of Brazil nuts. With just a few large cities, it's an area of remote Indian villages, and one that most certainly holds thousands of undiscovered species of plants and animals.

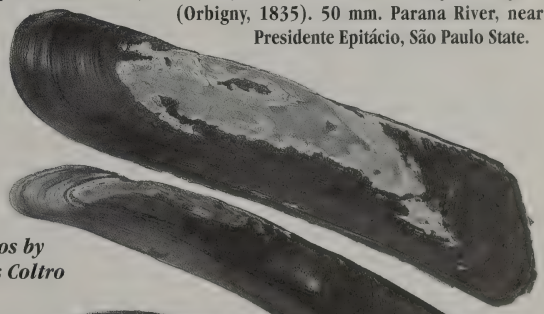
There Alex Bodart and the other members of the expedition worked hard to find land shells, but not a single one could they locate! However, in the Xapuri River they found two very interesting species: *Mycetopoda siliquosa* (Spix, 1827) and the rare *Mycetopodella falcata* (Higgins, 1868). This latter species was found only in the 19th century but oddly enough, had never been found since . . . until now!

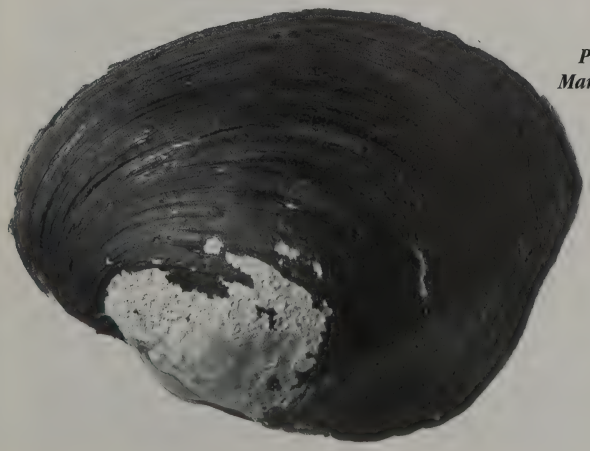
After fifty days, Alex and the crew returned to São Paulo, bringing twenty different species of fresh water bivalves, twelve fresh water gastropods (one is a new species) and sadly, only four land shells!

Femorale Ltd., Cx.P. 15011, São Paulo, SP, Brazil 01599-970
Email: *shells@femorale.com.br*



(Top photo) MYCETOPODIDAE *Anodontites obtusus* (Spix, 1827). 30 mm. Paraguai River, near Caceres, Mato Grosso State. (Above) HYRIIDAE *Diplodon granosus* (Bruguière, 1792). 25 mm. Machado River, Cacoal, Rondonia State. (Below at top) MYCETOPODIDAE *Mycetopoda siliquosa* (Spix, 1827). 110 mm. Xapuri and Rio Branco Rivers, Acre State. (Below, middle) *Mycetopodella falcata* (Higgins, 1868). 80 mm. Near Brasiléia, Bolivian border, Acre State. (Below at bottom) HYRIIDAE *Diplodon wagnerianus* Simpson, 1900. 18 mm. 67km north Itaperuna, betwenn border of Rio de Janeiro State and Espirito Santo State. (Below at left) MYCETOPODIDAE *Fossula fossiculifera* (Orbigny, 1835). 50 mm. Parana River, near Presidente Epitácio, São Paulo State.





Photos by Marcus Coltro

Louisiana Coast Discoveries

— *Continued from page 7*

If we consider the Mississippi River Delta as the division between the eastern and western Gulf, one more species needs to be included in the records. At three of the four stations where the box corer was used, specimens of *Terebra mugridgeae* García, 1999 (Fig. 13) were collected. I had found this species off the Mississippi coast in 1996, in anaerobic mud, from 18 to 56 m in depth, an ecological niche identical to that where the species was found off Louisiana: 22 to 54 m in anaerobic mud. This species is readily distinguished from all other western Atlantic species by having four protoconch whorls. Although its multispiral protoconch denotes planktotropic larval development and, therefore, a wide distribution, the species seems to be limited by its habitat, rather than by its dispersal ability.

My thanks to Drs. Darryl Felder and Suzanne Fredericq for inviting me to go on the expedition, and for allowing me the free use of equipment that has made the photography of the smaller species possible.

Dr. Harry G. Lee, of Jacksonville, Florida, was involved in the identification of the Louisiana material from the very beginning, and read, and made improvements upon, the manuscript. Not only did he help corroborating the identification of many of the species, but single-handedly straightened out the labyrinthine taxonomy of the Cerithiopsidae, Triphoridae and Pyramidellidae. Dr. Gary Rosenberg, of the Academy of Natural Sciences of Philadelphia, reviewed the list of taxa presumed as new records for the northwestern Gulf.

Typhinellus sowerbyi (Broderip), 15.8mm

Newly Recorded Species for Coastal Louisiana

Calliostoma sapidum Dall
Mirachelus corbis (Dall)
Teinostoma cocolitoris Pilsbry & McGinty
Rissoina vanderspoeli de Jong & Coomans
Cymatium occidentale Clench & Turner
Cerithiopsis warmkae de Jong & Coomans
Metaxia espinosai Rolán & Fernández-Garcés
Monophorus ornatus auct. non Deshayes
Triphora dupliniana Olsson
Triphora elvirae de Jong & Coomans
Triphora oreodoxa Olsson
Cycloscala cf. echinaticosta (d'Orbigny)
Niso hendersoni Bartsch, 1953
Vokesimurex anniae (M. Smith)
Coralliophila scalariformis (Lamarck)
Engina cf. corinnae Crovo
Antillophos elegans Guppy
Mitra straminea A. Adams
Vexillum epiphaneum (Rehder)
Vexillum hendersoni (Dall)
Glyphoturris eritima (Bush)
Cerodrillia bealiana (Schwengel)
Compsodrillia canna (Dall)
Discotectonica discus (Philippi)
Mathilda vanaartseni de Jong & Coomans
Turbonilla levis (C.B. Adams)
Turbonilla viridaria Dall
***Limatula* species** — probably undescribed
Cratis antillensis (Dall)

115 Oak Crest Drive, Lafayette, LA 70503 USA
Email: *efg2112@usl.edu*

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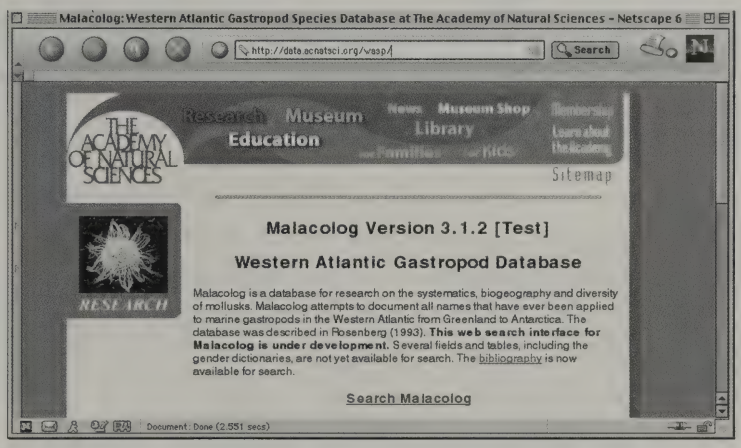
Malacolog Version 3

CONCHATENATIONS
by Gary Rosenberg

Malacolog is a database of all named living marine gastropod species in the Western Atlantic, from Greenland to Antarctica. I have distributed parts of it electronically since 1993, and it has been online on the Internet since 1995. The conventions of the database are described in Rosenberg (1993). The third version of Malacolog, released earlier this year, brings more sophisticated search capabilities, replacing the now outmoded "gopher" technology used in the previous version. Some browsers, such as Microsoft's Internet Explorer 5, do not support gopher, and increasingly, companies have closed the "gopher port" in their firewalls, considering it to be a security risk. Because of this I had been getting reports of users being unable to access the database. Malacolog Version 3 should be accessible to anyone with an Internet connection, but it has a new URL: *http://data.acnatsci.org/wasp*. WASP stands for Western Atlantic Species.

For each name in the database, I record the geographic and bathymetric distribution and the maximum known size of specimens. Data are recorded at the level of names rather than species, since some names that are currently thought synonymous may later be considered valid and it will be necessary to untangle the information that pertains to each species.



For each name I also try to see the original description in order to give a complete original citation and confirm details such as the original genus, spelling, and type locality. I have examined more than 7000 descriptions so far, generally targeting works in which multiple species are described. The names that remain are scattered in almost 2000 publications, so it will be a while until this aspect of Malacolog is completed.

Malacolog currently allows searches of the taxonomic database by family, genus, species or author. Geographic searches can be run on areas of biogeographic or political significance, such as countries, states and provinces, and islands. I hope soon to add the capability to search for species that occur in a box defined by latitude and longitude. Such a search will find species whose geographic range encompasses a certain area, but have not yet been recorded there, either because I haven't yet scanned the relevant literature, or because no published records exist.

The database currently contains 11,039 entries. Of these, 9591 are available names, the rest are misidentifications, misspellings, and nude or infrasubspecific names included for purposes of cross-reference. Among the available names, 4568 are currently considered to be valid Western Atlantic species, 4578 are synonyms, 196 are dubious names that haven't yet been satisfactorily identified, and 68 are valid species from other oceans that erroneously have been reported in the Western Atlantic. The ratio of synonyms to valid names in the Western Atlantic is almost exactly one to one. However, many of the synonyms belong to species with amphiatlantic and circumtropical ranges; among the 3605 species restricted to the Western Atlantic, there are 2073 synonyms.

Assuming a conservative ratio of 2.5 gastropods species to each species of other molluscan classes (the ratio in Abbott's *American Seashells* is 2.34:1), the Western Atlantic mollusk fauna now stands at about 6400 species, validating the prediction of Clench (1959) that it "would exceed 6,000 species and subspecies." Clench also thought that the fauna would not reach 8,000 species and subspecies, but even that number now seems to be in reach.

In the last twenty years, 926 species of gastropods were named from the Western Atlantic. Assuming that 60% of these are valid, and the rate of discovery remains constant, then the Western Atlantic mollusk fauna will surpass 8,000 known species in about 60 years, just about 100 years after Clench made his prediction. Of course the rate of discovery must level off eventually, but it shows no sign of doing so as yet.

The median size of the species named in the last 20 years is 12.5 mm, whereas the median for species discovered before then is 12.0, so there does not seem to be a trend toward increased emphasis on micromollusks. There also appears to be no trend in bathymetry: the median depth for live-collected material of species named in the last 20 years is 22.5 m, compared to 25.5 m for species discovered before that (calculated based on the midpoint of the depth range of each species).

Thus it appears that studies of micro-mollusks and exploration of deeper water, coupled with the advancing ability to detect difference among morphologically similar organisms by analysis of DNA sequences, leave ample room for the discovery of new species.

Malacolog also can be queried through its bibliography, by author, year, title, journal, and publisher. The online search results show the Western Atlantic gastropod species named in each work, if any, and by clicking on any name, one can see the current classification and related information. The bibliography details more than 2300 items, more than 1300 of which contain descriptions of new species, subspecies or varieties. Searching by subject is not possible, since I have not classified items by subject, but searching the title by keywords serves a similar function.

If one set out to compile a library of Western Atlantic species, what works would give the greatest coverage? Subscriptions to the top ten journals for descriptions of new Western Atlantic species would have covered

— *Continued on page 31*

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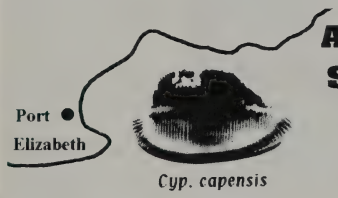

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Livett Interview

— *Continued from Page 5*

importance of making contacts with shell collectors for local knowledge and help about shells of interest.

• Ian Loch, Sydney, for his knowledgeable and encouraging interest in my work.

• Robyn Bradbury for her enthusiasm for collecting *Conus* and interest in medical applications of conopeptides.

• Patty Jansen for her beautiful drawings and useful field guides to Australian shells.

• Winston Ponder for his leadership of Malacology in Australia

Tell us about some most memorable malacological experiences. Which ones have affected your career?

Definitely, the Field Trip I organized to One Tree Island on which George Miljanich (from Neurex Corp.) came along. The weather was perfect, the shells were in abundance and the company was great. I especially remember the late hours spent dissecting and discussing matters conological and the numerous games of Trivial Pursuit.

What was your most embarrassing or funny moment when dealing with shells?

Most embarrassing moment would have to be when my son and I booked into a motel in Harvey Bay, Queensland, with a collection of live *Strombus luhanus* that had been jostled about a bit in our yacht during a storm that afternoon. By 3 AM that morning it was all we could do to get the double sliding windows open and let some fresh air into the room so we could sleep. A good two hours the next morning was spent making the room liveable. Amazingly, most of the strombs survived the journey back to Melbourne.

Some time ago we had a thread on Conch-L called "The Revenge of the Conus." It was a nightmare about a Conus attack after collection. How really dangerous is it to collect Conus?

I know that article and found it somewhat amusing. It is of course prudent to take every precaution. But mostly the cones are shy and not aggressive so it is quite sufficient to handle them slowly and carefully and always keep them in a hard plastic box, not a mesh collecting bag. We always wear protective gloves and pick them up with barbecue tongs. I have observed their behavior in the wild and in aquaria and they move rather slowly. Still I would not put my hand in front of their extended proboscis. No way!

***Conus* poisonings are rare, about 30 confirmed deaths, and I read that you call it a "painless death." Tell us a little bit about it.**

The witnesses report that it is a painless death. That may be because of the analgesic nature of some of the conopeptide components of the venom. Death usually occurs after some hours following a coma that can set in within 20 minutes. Artificial respiration can help. There was a case in New Guinea not long ago where a diver was stung by a *Conus geographus* and lived to tell the tale because he was able to get to an iron lung in time. Death is usually a result of asphyxiation due to inhibition of contraction of the diaphragm muscle which has muscle-type nicotinic acetylcholine receptors that are targeted by the alpha conotoxins in the venom. The symptoms are similar to curare poisoning.

I've heard that a conotoxin is much more complex and strong than a snake venom. Is that true?

More complex yes. There are up to 20 different peptide components in a single cone shell venom, whereas snake venom usually contains just one or two components. In the cone shell venom the different conopeptides target the different neuronal ion channels. Some conotoxins bind to and inhibit sodium channels, some calcium channels, others potassium channels and still others, glutamate and acetylcholine-gated ion channel receptors. The combined cocktail can be very effective!

What *Conus* species are more dangerous?

In general, all the fish-hunting cone shells (i.e. piscivorous) such as *Conus geographus, Conus striatus, Conus tulipa.*

How dangerous are the Atlantic Ocean *Conus*? What can a collector expect from, for example, a *Conus regius* sting?

Conus purpurascens should be handled with care. I am not aware of reported fatal envenomations of humans by *Conus purpurascens* or *Conus regius*. Best to be careful though. You would not want to go down in history as the first victim.

We had a very interesting thread on Conch-L called "Cone Wars," in which Don Barclay from American Samoa described some hunting habits of *Conus* living in his aquarium. What kind of interesting live habits of *Conus* species have you observed during your researches?

I concur with the observations of Don and have only observed for any length of time the behavior of *Conus marmoreus, Conus magus* and *Conus textile*. Of the three, *Conus textile* is the most aggressive. These observations are described in an accompanying account given at Molluscs2000 and a video produced.

What do you do when you're not working on shells?

I play bassoon and present programs of classical music on a local FM radio station. You can listen in if you wish over the web. Every third (8.30 PM) and fourth (7 PM) Thursday of the month on 3mbs-FM 103.5 *(http://www.3mbs.org.au/)*. Just click on the radio to hear! When not playing music, I like to go sailing with my good mates, Ken Gayler (Molecular Biologist) and David Satchell (Zoologist).

Nowadays shell clubs in America and around the world struggle with a lack of newbies. What would you do to encourage beginning collectors?

Take along as many young people as possible to local meetings and shell shows and encourage shell collecting activities at local beaches during the summer (easier said than done, I agree).

What three pieces of advice would you give a beginning shell collector?

Make friends with other collectors. Go on as many field trips as you can. Attend annual shell shows.

Lately, live shell bans are a fashion everywhere, as well as in Australia. Do you think shell collectors really impact the environment?

No, not in my experience. To collect in Australia I have to apply for a permit. The numbers I can remove from, for instance, the Great Barrier Reef are very restrictive (no more than 5 of any species). I think much more impact is made by natural elements, storms, runoff water, pollution, wave action.

For you, what is the role of amateur collecting in modern malacology / conchology?

Amateur collectors are the life of malacology. The new finds are more likely to come from amateurs than from the few professionals. Amateurs are also, in my experience, very attuned to conservation issues. I am all for encouraging amateur members to belong to shell clubs and malacology societies.

Just to finish our interview, what message would you like to send to our readers?

This being the first day of the new millennium, I would like to wish all your readers the very best for the New Year and the millennium ahead and good shelling.

Email: *B.Livett@Biochemistry.unimelb.edu.au*

Conch-L: Cyber-Window on the Shell World

Any shell related subject you'd care to discuss has been taken on by the informed and generous members of *Conch-L* at one time or another in its five+ year history — explored, investigated, often downright subdued and pinned to the mat! If a subject of interest is not under current discussion, chances are that you can find one or more "threads" (computer-speak for all the messages on a single topic or conversation) in the conchological archives maintained at the University of Georgia at:

http://www.listserv.uga.edu/archives/conch-l.html

A recent discussion on Epitoniums and Fakes

When **Andrew Sharpe**, a shell dealer from British Columbia, wrote to ask the size record for *Epitonium rugosum,* our favorite facts man, **Paul Monfils**, wrote: "The record in the book is a paltry 98.8 mm. However, someone posted on Conch-L during the past year that they had just received a much larger one. I located that message in the Conch-L archives. The reported size there is 133.2 mm! Now that's an Ep!"

A real *Epitonium rugosum* is shown in an x-ray (above); it's easy to see the shell's complex internal structure. A 133.2mm Epitonium is shown in the x-ray on the right; this specimen lacks the detailed inner structure, revealing itself to be a fake.

Joyce Webb from Loudon, TN contributed more information: "The latest WRS [World Record Size] Book lists the *Epitonium rugosum* as 103.7mm, owned by Don Pisor."

Emmanuel Guillot de Suiderat, a shell dealer from the Philippines, also told us that: "WSR is 103.7 mm. Don Pisor 1993. I have already seen some large *E. rugosum* 80 to 100 mm. All [have] the protoconch missing and repaired by the fake doctor of Punta Engano. The perfect ones, live, 75 mm [and] over, are rare."

Tom Eichhorst, always with an eagle eye for the interesting shell and an addiction for the COA Bourse, commented: "I wonder if that 133mm specimen is the same as a similar sized one at the last COA convention (2001). There was a 130mm+ specimen that was a fake so well made you really couldn't tell with the naked eye. My suspicions were aroused by the size (of course) and the incredible condition of the shell. I wish now I had checked the price — but it was on the second day of the bourse and I would have been hard pressed to buy a coke and hamburger at McDonalds."

COA Member and shell dealer **Mique Pinkerton**, seeing her 133.2 mm *Epitonium rugosum* mentioned, responded: "I noted your query re: the *Epitonium rugosum*...the reply was doubtless about the one we received last year . . . I have a suspicion someone in the Philippines is a darn good artist. By the looks of the shell, it couldn't be more perfect . . . however when in doubt we have taken the shell to our good friend, the veterinarian, who x-rayed it for us at a small fee. Worth every penny and unless the little animal got carried away and couldn't help itself, there is no inner structure to show the spiral . . . a solid shell for the most part . . . Can't find the x-ray at the moment ... but take it from me it is a fake . . . a beautiful fake. We even told our supplier that we had had the picture made and he seemed shocked and couldn't believe it . . . Of course we kept the shell . . . to me it's a work of art and as valuable as real one would be.

"This is not the first 'record' size shell we have gotten from the Philippines, so now we have [them] x-rayed . . . One time a shell was altered to be another species but the one they used was worth more than the one they created."

Fortunately for us, just before press time, Mique found the x-rays in question, which we are reproducing here for your viewing pleasure.

Paul responded: "Does anyone know what kind of material these fake *Epitonium* are made of? There is the old story of fake *Epitonium scalare* made of rice paste (back when *E. scalare* was still a rare species). But I assume these *E. rugosum* are made of something a bit more 'high tech'?"

Andrew Sharpe then posted on his website a photo of the *Epitonium rugosum* that prompted his inquiry. It turned out to be a perfect and gorgeous 147.4 mm shell. He asked: "What do I look for upon having it x-rayed? What are the tell tale signs of a fake? This one I have feels real and looks real but now I have doubts."

Paul Monfils responded to Andrew's amazingly large and lovely shell: "Actually, if the size of that specimen is confirmed and listed, it will not only be the world's largest *Epitonium rugosum*, but also the world's largest known epitoniid, surpassing even the listed record size of *Amaea magnifica*, which

— Continued on page 23

Long Island Shelling Update

by Steve Rosenthal

It's been a while since anybody really updated the shelling world regarding what's up on Long Island – see, *e.g.,* Rich Goldberg's article in *Of Sea and Shore*, (1977), and of course the Long Island Shell Club's *Seashells of Long Island* (1988). There are a few good reasons for that, I suppose. First, Long Island is not rich in shells – too cold in winter, too hot in summer. Secondly, as with our hobby nationwide, interest in collecting itself is declining. Right now we are down to about six members (out of our total membership) who still actively search local shorelines. Paradoxically, however, it would appear things shell-wise are as good or better than ever. In the following installments, I'll illustrate what I mean.

Deep Water Shells. In the past, exploration of the area around the fishing boat docks near Shinnecock Inlet has yielded occasional specimens of *Astarte undata*, *Cyclocardia borealis*, *Colus pygmaeus*, *Hiatella arctica*, etc.; these were usually found in a storage area for fishing gear, nets, etc. Usually, not much turned up on any single visit, though one time we found a dried net packed with horse mussels (*Modiolus modiolus*), decent sized *Hiatella arctica*, and a few *Colus pygmaeus*. To my knowledge, nobody ever really stumbled onto shell-hauls in earnest, just bits and pieces of fishing by-products. In November, 1999, we visited this site and after finding some of the above, we saw some fishermen working on their boats, and (why not?) asked them if they ever got any shells.

Imagine our surprise when they promptly produced a basket full of live *Neptunea decemcostata*! They told us they were about 20-25 miles offshore when they got these in their nets; they had never seen them before, and were saving them to use as bait! Now many of you may be thinking, "Big deal!" This is after all a common shell north of Cape Cod, especially in Maine and Canada. But, in all my experience and contacts with the Long Island and New York Shell Clubs, nobody ever actually saw any from New York. According to Romuald Czepulkowski, this species does appear on some old New York faunal lists, circa the late 1800s. But it is not mentioned at all in the two seminal works on local shells: Emerson & Jacobson: *Shells of the New York City Area* / AKA *Shells from Cape Cod to Cape May*; and the Long Island Shell Club's *Seashells of Long Island*. This was our first recent "red-letter" day. Up to that point, *Arctica islandica* had been the only interesting deep-water shell to have been obtained from fishermen at this location.

Then, in March of 2001, Frank Margiotta and I stumbled onto a "live" *Placopecten magellanicus* (sea scallop) shucking operation here. In our case, the end product was all we saw – hundreds of pounds of shucked sea scallops (taken offshore in about 130 feet), stacked up in plastic tubs, awaiting burial at sea. Nirvana for the shell collector! The searching was laborious and mentally taxing. As scallop pile shellers know, it is hard work to find "the needles in the haystack," i.e. the non pecten shells. This lot was no exception. It was easy to find cup and saucer shells, *Crucibulum striatum*, still attached to the scallops. The fishermen call these shells "quarterdecks." Interestingly, about 1-2 % seemed to be albinos (Rich Kelly has similarly obtained albinos from a pile near Cape May, New Jersey). Also attached were slipper shells, *Crepidula fornicata*, which upon cleaning were found to be much thinner, lighter, flatter, and far less pigmented than equally-sized shallow water specimens. Live specimens of *Buccinum undatum* were fairly easy to spot, some in not-so-bad shape. Previously, we had some success finding this locally elusive shell as either crabbed, or fresh-dead specimens from lobster traps near Montauk, at the extreme east end of Long Island. Like the *Neptunea*, these are a deeper water shell locally, but more common in shallow water north of Cape Cod. Also, present were large moon snails, *Lunatia heros*, some paired *Arctica islandica*, and of course plenty of *Placopecten magellanicus*, quite a few still paired and un-shucked, many of which were albino. Needless to say, a dinner of fresh sea scallops inevitably accompanies each of my collecting trips! (Although we had not, as of October, 2001, seen any *Neptunea* in the bins, we did get one dead one from one of the boat crews and later got a few nice live specimens during the fall along with some *Colus stimpsoni)*.

That sums up the larger shells. Smaller shells were more challenging to find, the best method I could come up with was just scanning the top of the tubs — if there were any little accumulations of sediment or bottom organisms (such as sand dollars) these areas would get picked through slowly. Using this technique, *Colus pygmaeus, Lunatia triseriata, Nassarius trivittatus* (some at 28mm; the largest size I could find cited in any of my books was 22mm) turned up in decent numbers. Bivalves could be found too, large and small *Astarte undata, Cyclocardia borealis*, and a couple of *Cerastodema pinnulatum*. The best surprise in this regard was a bean mussel, *Musculus niger*, a species *never* recorded locally, according to Lenny Brown. This specimen was sitting right in the "tippy top" of the bin, in some mud, in a shucked scallop valve. We have also seen pieces of *Thracia conradi*, a not uncommon, but "hard to actually get" shell, and two specimens (dead) of a deep water turrid (*Lora* species). Large horse mussels, *Modiolus modiolus*, have also been found in small numbers.

Despite the above successes, however, a lot more time was spent looking, than finding. Another method was to just progressively empty the contents of one bin into an empty one, and pick through it as we went, an easy way to spot the bigger shells. Then when we were done, we could check the thin layer of mud, scallop guts, and debris still clinging to the bottom of the original tub. This was how some *Colus* and smaller bivalves turned up. In one of the bins, I saw a familiar shape partially visible in the mud — *Boreoscala greenlandica*, the Greenland Wentletrap, a beautiful slender gem of 32mm! This is about as good as it gets around here! Lenny Brown, one of the co-authors of the recent *Epitonium* book, notes dealers have had this species from New York before, and finding it here is thus no surprise from a bio-geographic viewpoint, but it is still a personal milestone for me. And its presence was re-confirmed by another, smaller specimen (23mm) on June 10, 2001. Now (end of December) we have been here many times and gotten friendly with one of the deck-hands here who has started to save stuff for us, and we have persuaded the women who do the shucking to save some nice shells for us too. I've already obtained some nice shells that way, including a larger *Colus stimpsoni*. And on December 8th, I came up with a bright pink *Calliostoma bairdii* in the bins!

Shallow Water Shelling. Despite limited overall collecting activity, inter-

esting finds continue to be made: *Corbula contracta*, perhaps the most locally elusive non-micro-mollusk, on a cobblestone beach near Southold, New York; Pteropods, *Siliqua costata*, and *Lyonsia hyalina* on the beach at Jones Beach State Park (the Atlantic shore of Nassau County) one spring weekend when the drift was unusually abundant, and rich in shells. But, to get a good idea of how things are, let's look in detail at one spot I have been visiting regularly for years (especially in the last 8 years, now that I live only about 10 minutes away), the beach and intertidal areas on the bay side of Jones Beach State Park, east of the fishing piers at parking field #10.

This was always a good spot for common mud/sand burrowing species, especially bivalves like *Mya arenaria, Mercenaria mercenaria, Ensis directus,* and *Macoma balthica*. The most interesting finds were occasional paired *Pitar morrhuanus* and single valves of *Barnea truncata*. Lots of abundance, yet not much diversity of mollusks. But over the last few years things have seemed to change. Maybe it was because I was searching more often, or harder. Maybe environmental conditions were changing for the better. Probably both. I started seeing species I'd never seen there before. For example, during the autumn, I would find a few pairs of live bay scallops, *Argopecten irradians*, usually about 1" or so in size (= 1 year old), and throughout the year larger, clearly fresh single valves. To my knowledge, this species was unheard of in Nassau County, although they can be found as Holocene sub-fossils on ocean beaches. This species needs clean water to feed and was essentially wiped out on eastern Long Island during the 1980s, due to an unexplained bloom in brown algae that clogged their feeding apparatus and suffocated them. Thus their appearance again, let alone in a new area, is a good sign. Other species that were previously quite uncommon and now frequent and regular include *Anadara ovalis*, *Anadara transversa, Pitar morrhuana*, and small gastropods such as *Ovatella myosotis, Haminoea solitaria, Lacuna vincta, Acteocina canaliculatus* and *Rictaxis punctostriatus*.

Late one winter, I found a perfect fresh specimen of the awning clam, *Solemya velum*, under a board. Thus it was not a total surprise when we found them washing up, alive, in large numbers after some stormy weather this past March (March seems to be the best time to find this species locally). Along with them were several single valves and one paired *Corbula contracta* (which I still consider the "rarest" shell at this site, and throughout Long Island too), a whopping 16mm pteropod (*Cavolinia tridentata*); *Turbonilla interrupta*; and the aforementioned small gastropods.

In the summer of 2000 I also succeeded in digging out some small (ca. 1") *Barnea truncata* alive from thick banks of peat exposed at low tide. Although larger single valves are often found nearby, the live ones had eluded us before. Now we had some idea of where the live ones *might* be. Most recently (this past April), I have begun finding paired valves of the Stout Razor clam, *Tagelus plebeius* in one small muddy area here. Although common overall, this shell is locally quite uncommon, with localized populations known from several areas out east, around Shinnecock Bay and also in a few places on Long Island's northeast end (i.e., the "North Fork"). Again, as with the scallops, this appears to be a "first" for this species on the south shore of Nassau County (or anywhere in Nassau, for that matter). In the same area, large *Mulinia lateralis* (another mud/sand loving species) could also be found; another first for this location. Also, on Memorial Day, I saw a 1" brown and white nudibranch crawling on the sand at low tide in a few inches of water! And around this time (September, 2001) *Haminoea solitaria*, our local bubble shell, was out in greater abundance than I have ever seen, crawling about on the mud flats and laying eggs everywhere, with hundreds of dead ones in the drift line as well. Thus, at present, my species list from this location is now at forty six (shelled) species – not bad for Long Island. And, who knows what else may turn up?

Another shallow water development concerns our local wentletrap, *Epitonium rupicola*. In the past, specimens were frequently found only at one location, Islip Town Beach, on the Great South Bay. In recent years not only has access been a problem, but the shells generally have not been found there. The access problem is two-fold. It is a "residents only" site from Memorial Day through Labor Day, and the prime beach area for the *Epitonium* (actually part of a national wildlife refuge adjacent to the town beach) is rather diligently patrolled, and displays signs that make it clear that visitors are not encouraged. Thus it was of interest when in May of 1999, Mel and Sylvia Springer found this shell in quantity at Bellport Village Park, in Bellport, a few miles east of Islip on The Great South Bay. One large specimen was about 23mm. We have visited this spot and also found them here and at other spots between Bellport and Islip. Thus, this species has effectively been rediscovered locally. Also, while looking for these again in September at Bellport Village Park, we found two specimens of our only "common" local turrid, *Mangelia plicosa*, (never recorded before from Long Island's south shore!)

Regarding the latter species (*Mangelia plicosa*), it had become something of an ongoing curiosity that one of our few avid field collectors, Romuald Czepulkowski, a specialist in Turridae, had never before found this species locally (or elsewhere). On one trip several Novembers ago, we went to the beach at North Haven, the best source for the shell as far as we knew. There was a decent drift line and we divided it in half; I went west and Romuald took the east. Within minutes, I had found one, and that turned out to be the only one seen that day. On the aforementioned trip to Bellport Village Park, Romuald had not been able to go the day the *Mangelia* were found. I subsequently reported to him that we had found two specimens, and he and I returned about a week later. We searched the entire beach, inch by inch and found nothing. A few weeks later, Rich Kelly and I shelled a small beach in Greenport, across the bay from North Haven (on the other side of Shelter Island). Although this beach had not been productive in the recent past (due to some construction work that apparently stopped most of the drift from washing up) the construction seemed to be gone, and there was plenty of drift. To our surprise, we quickly began finding *Mangelia plicosa* in the very abundant beach litter, and ended up with over a dozen specimens between us. We promptly informed Romuald of our success (probably ensured again by his absence) and organized a return visit for two weeks later.

The weather and tide looked like they would cooperate, and we were thinking this return would be as close to a "sure thing" as you can get when shelling! When we arrived there seemed to be even more drift than two weeks ago. We wondered if anything new had washed up, thinking just our luck, we had found them all before. Nope, the sure thing came through. I found one, Rich found one, Rich and I found more (we pointed them out to Romuald before picking them up so he could develop the right "search image"). And a few minutes later, Romuald's big moment finally came! By the end of the day we had over twenty among the three of us. We bagged up some of the drift and found more specimens when we went through it later. The total was thus about two dozen specimens from a small area, a few hundred feet long. Another "elusive" Long Island shell had been rounded up by the Long Island shell seekers.

Email: *Steve.Rosenthal@Pfizer.com*

Systematic Checklist of the Shelled Marine Mollusks of Long Island, New York

by Lenny Brown

Appendix I of the *Seashells of Long Island* (1988) included a checklist of marine mollusks whose occurrence has been documented in the waters of Long Island. Since that initial checklist was published, thanks to the kind of fieldwork discussed in this article, the occurrence of a number of additional species has been documented. This checklist includes all the marine mollusks with shells that have been found to date. The area covered by this checklist includes the offshore waters to the edge of the continental shelf, the portion of the Long Island Sound that is under the jurisdiction of New York State and the bay and estuaries of Long Island.

In deciding whether to include a species on this checklist, we applied the following criteria. First of all, species were included on this checklist if a specimen is actually available in a collection of a member of the Long Island Shell Club or in a public collection. Secondly, published records of occurrence with good locality data were accepted if they met the criteria needed to be included in the original checklist. A general statement in literature regarding the occurrence of a species on Long Island was not sufficient documentation to justify including a species on this checklist.

With respect to taxonomy, the authors used as their starting point the taxonomy used in *Seashells of Long Island* and *American Seashells* (1974). This was updated to include the taxonomy utilized in the CLEMAM (Checklist of European Marine Mollusca) database and the taxonomy used by Dr. Harry Lee in his Florida mollusk checklists.

CLASS BIVALVIA

Family NUCULIDAE Gray, 1824
_____ *Nucula proxima* Say, 1822
Family YOLDIIDAE Glibert & van de Poel, 1965
_____ *Yoldia limatula* (Say, 1831)
_____ *Yoldia sapotilla* (Gould, 1841)
Family SOLEMYIDAE Gray, 1840
_____ *Solemya velum* Say, 1822
Family MYTILIDAE Rafinesque, 1815
_____ *Geukensia demissa* (Dillwyn, 1817)
_____ *Modiolus modiolus* (Linnaeus, 1758)
_____ *Mytilus edulis* Linnaeus, 1758
_____ *Crenella glandula* (Totten, 1834)
_____ *Musculus niger* (Gray, 1824)
Family ARCIDAE Lamarck, 1809
_____ *Anadara ovalis* (Bruguiere, 1789)
_____ *Anadara transversa* (Say, 1822)
_____ *Noetia ponderosa* (Say, 1822)
Family LIMOPSIDAE Dall, 1895
_____ *Limopsis sulcata* Verrrill & Bush, 1898
Family PECTINIDAE Rafinesque, 1815
_____ *Argopecten irradians* (Lamarck, 1819)
_____ *Palliolum imbrifer* (Lovén, 1847)
_____ *Placopecten magellanicum* (Gmelin, 1791)
Family ANOMIIDAE Rafinesque, 1815
_____ *Anomia simplex* Orbigny, 1842
_____ *Anomia squamula* Linneaus, 1758
Family OSTREIDAE Rafinesque, 1815
_____ *Crassostrea virginica* (Gmelin, 1791)
Family LUCINIDAE Fleming, 1828
_____ *Divaricella quadrisulcata* (Orbigny, 1842)
Family KELLIIDAE Forbes & Hanley, 1849
_____ *Aligena elevata* (Stimpson, 1851)
Family MONTACUTIDAE Clark, 1855
_____ *Mysella planulata* (Stimpson, 1851)
Family CARDITIDAE Fleming 1828
_____ *Cyclocardia borealis* (Conrad, 1831)
Family ASTARTIDAE Orbigny, 1844
_____ *Astarte castanea* (Say, 1822)
_____ *Astarte crenata* (J. Gray, 1824)
_____ *Astarte undata* Gould, 1841
Family CRASSATELLIDAE Férussac, 1822
_____ *Crassinella lunulata* (Conrad, 1834)
Family CARDIIDAE Lamarck, 1809
_____ *Laevicardium mortoni* (Conrad, 1830)
_____ *Cerastoderma pinnulatum* (Conrad, 1831)
Family MACTRIDAE Lamarck, 1809
_____ *Mulinia lateralis* (Say, 1822)
_____ *Spisula solidissima* (Dillwyn, 1817)
Family MESODESMATIDAE Gray, 1839
_____ *Mesodesma arctatum* (Conrad, 1830)
Family SOLENIDAE Lamarck, 1809
_____ *Ensis directus* Conrad, 1843
_____ *Siliqua costata* Say, 1822
Family TELLINIDAE Blainville, 1814
_____ *Macoma balthica* (Linnaeus, 1758)
_____ *Macoma tenta* (Say, 1838)
_____ *Tellina agilis* Stimpson, 1857
Family DONACIDAE Fleming, 1828
_____ *Donax variablis* Say, 1822
Family SEMELIDAE Stoliczka, 1870
_____ *Cumingia tellinoides* (Conrad, 1831)
Family SOLECURTIDAE Orbigny, 1846
_____ *Tagelus plebeius* (Lightfoot, 1786)
Family ARCTICIDAE Newton, 1891
_____ *Arctica islandica* (Linnaeus, 1767)
Family VENERIDAE Rafinesque, 1815
_____ *Gemma gemma* (Totten, 1834)
_____ *Mercenaria mercenaria* (Linnaeus, 1758)
_____ *Pitar morrhuanus* Linsley, 1848
Family PETRICOLIDAE Deshayes, 1839
_____ *Petricola pholadiformis* (Lamarck, 1818)
Family MYIDAE Lamarck, 1809
_____ *Mya arenaria* Linnaeus, 1758
Family CORBULIDAE Lamarck, 1818
_____ *Corbula contracta* Say, 1822
Family HIATELLIDAE Gray, 1824
_____ *Hiatella arctica* (Linnaeus, 1767)
Family PHOLADIDAE Lamarck, 1809
_____ *Barnea truncata* (Say, 1822)
_____ *Cyrtopleura costata* (Linnaeus, 1758)
_____ *Xylophaga atlantica* H. G. Richards, 1942
_____ *Zirfaea crispata* (Linnaeus, 1767)
Family THRACIIDAE Stoliczka, 1870
_____ *Thracia conradi* Couthouy, 1838
Family TEREDINIDAE Rafinesque, 1815
_____ *Teredo navalis* Linnaeus, 1758
Family LYONSIIDAE Fischer, 1887
_____ *Lyonsia hyalina* Conrad, 1831
Family PANDORIDAE Rafinesque, 1815
_____ *Pandora gouldiana* Dall, 1886
Family PERIPLOMATIDAE Dall, 1895
_____ *Periploma leanum* (Conrad, 1831)
_____ *Periploma papyratium* (Say, 1822)

CLASS GASTROPODA

Family LOTTIIDAE Gray, 1840
_____ *Tectura testudinalis* (O.F. Mueller, 1776)
Family TROCHIDAE Rafinesque, 1815
_____ *Solariella obscura* (Couthouy, 1838)
_____ *Calliostoma bairdii* Verrill & Smith, 1880
Family HYDROBIIDAE Troschel, 1857
_____ *Hydrobia totteni* Morrison, 1954
Family LACUNIDAE Gray, 1857
_____ *Lacuna vincta* (Montagu, 1803)
Family LITTORINIDAE Gray, 1840
_____ *Littoraria irrorata* (Say, 1822)
_____ *Littorina littorea* (Linnaeus, 1758)
_____ *Littorina obtusata* (Linnaeus, 1758)
_____ *Littorina saxatilis* (Olivi, 1792)
Family ASSIMINEIDAE H. & A. Adams, 1856
_____ *Assiminea succinea* (Pfeiffer, 1840)
Family CAECIDAE Gray, 1850
_____ *Caecum cooperi* S. Smith, 1860
_____ *Caecum pulchellum* Stimpson, 1851
Family CERITHIIDAE Férussac, 1822
_____ *Bittium alternatum* (Say, 1822)
Family CERITHIOPSIDAE H. & A. Adams, 1853
_____ *Retilaskeya emersonii* (C. B. Adams, 1839)
_____ *Cerithiopsis greeni* (C. B. Adams, 1839)
_____ *Seila adamsi* (H. C. Lea, 1845)
Family TRIPHORIDAE Gray, 1847
_____ *Triphora nigrocincta* (C.B. Adams, 1839)
Family EPITONIIDAE S. S. BERRY, 1910
_____ *Boreoscala greenlandica* (Perry, 1811)
_____ *Epitonium championi* Clench & Turner, 1952
_____ *Epitonium humphreysii* (Kiener, 1838)
_____ *Epitonium multistriatum* (Say, 1826)
_____ *Gyroscala rupicola* (Kurtz, 1860)
Family EULIMIDAE Philippi, 1853
_____ *Melanella cf. conoidea* (Kurtz & Stimpson, 1851)
Family CALYPTRAEIDAE Lamarck, 1809
_____ *Crepidula convexa* Say, 1822
_____ *Crepidula fornicata* (Linnaeus, 1758)
_____ *Crepidula plana* Say, 1822
_____ *Crucibulum striatum* Say, 1824
Family NATICIDAE Guilding, 1834
_____ *Euspira heros* (Say, 1822)
_____ *Euspira immaculata* (Totten, 1835)
_____ *Euspira triseriata* (Say, 1826)
_____ *Neverita duplicata* (Say, 1822)
_____ *Tectonatica pusilla* (Say, 1822)
Family MURICIDAE Rafinesque, 1815
_____ *Eupleura caudata* (Say, 1822)
_____ *Nucella lapillus* (Linnaeus, 1758)
_____ *Urosalpinx cinera* (Say, 1822)
Family COLUMBELLIDAE Swainson, 1840
_____ *Costoanachis avara* (Say, 1822)
_____ *Costoanachis lafresnayi* (Fischer & Bernardi, 1857)
_____ *Mitrella lunata* (Say, 1826)
Family BUCCINIDAE Rafinesque, 1815
_____ *Buccinum undatum* Linnaeus, 1758
_____ *Colus islandicus* (Gmelin, 1791)
_____ *Colus pygmaeus* (Gould, 1841)
_____ *Colus stimpsoni* (Mörch, 1867)
_____ *Neptunea demecostata* (Say, 1826)
Family MELONGENIDAE Gill, 1867
_____ *Busycon carica* (Gmelin, 1791)
_____ *Busycotypus canaliculatus* (Linnaeus, 1758)
Family NASSARIIDAE Iredale, 1916
_____ *Ilyanassa obsoleta* (Say, 1822)
_____ *Ilyanasa trivitta* (Say, 1822)
_____ *Nassarius vibex* (Say, 1822)
Family TURRIDAE H. & A. Adams, 1853
_____ *Kurtziella cerina* (Kurtz & Stimpson, 1851)
_____ *Prygocythara plicosa* (C. B. Adams, 1850)
_____ *Propebela scalaris* (Möller, 1842)
Family PYRAMIDELLIDAE Gray, 1840
_____ *Boonea bisuturalis* (Say, 1822)
_____ *Boonea seminuda* (C.B. Adams, 1837)
_____ *Fargoa cf. F. gibbosa* (Bush, 1909)
_____ *Odostomia producta* (C. B. Adams, 1840)
_____ *Pyramidella cf. P. candida* Mörch, 1875
_____ *Sayella fusca* (C. B. Adams, 1839)
_____ *Turbonilla elegantula* A. E. Verrill, 1882
_____ *Turbonilla interrupta* (Totten, 1835)
_____ *Turbonilla nivea* (Stimpson, 1851)
Family ACTEONIDAE Orbigny, 1842
_____ *Rictaxis punctostriatus* (C. B. Adams, 1840)
Family CYLICHNIDAE H. & A. Adams, 1854
_____ *Acteocina canaliculata* (Say, 1826)
Family HAMINOEIDAE Pilsbry, 1895
_____ *Haminoea solitaria* (Say, 1822)
Family CAVOLINIIDAE Gray, 1850
_____ *Cavolinia longirostris* (Blainville, 1821)
_____ *Cavolinia tridentata* (Niebuhr, 1775)
Family MELAMPIDAE Stimpson, 1851
_____ *Melampus bidentatus* Say, 1822
_____ *Myosotella myosotis* (Draparnaud, 1801)

CLASS POLYPLACOPHORA

Family ISCHNOCHITONIDAE Dall, 1889
_____ *Tonicella rubra* (Linnaeus, 1767)
_____ *Chaetopleura apiculata* (Say, 1838)

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News of our Members and Friends

Dr. Harold Tovell of Sanibel passed away May, 2001. He was chairman of the board of directors at the Bailey Matthews Shell Museum during its formative period, working closely with Dr. R. Tucker Abbott, who died in late 1995.

Travis Payne and **Andrea Chenault** were married October 13, 2001. Son of Sally Payne of Huntsville AL, a well known sheller herself, Travis is a veteran sheller, exhibitor, and COA member from the North Alabama Shell Club. Groomsmen were Kim Hutsell (CA), author of the Registry of World Record Size Shells and Rich Goldberg (MD), proprietor of Worldwide Specimen Shells and former member of American Conchologist's editorial board and staff. Our shell world is a small one! Congratulations, you two! Wish we could have attended!

Our old friend and COA board member **John Baker** of the Astronaut Trail Shell Club is recovering from a fall and resulting broken wrist.

Two club newsletters seem about to close their pages. The Northern California Malacozoological Club's *Newsletter* is expiring due to dwindling membership, and dissolution of the club is being considered. For the same reason, Indianapolis Shell Club's *The Slit Shell* is folding also, though the club will continue. We regret these losses!

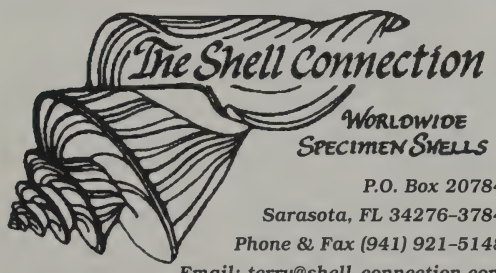
Leslie Crnkovic deserves congratulations for winning the new (one year old) Pilsbry Award at the Philadelphia Shell Show in November. His winning exhibit was entitled, "*Calliostoma brunneum* — Dispelling the Myths." The Pilsbry Award is offered to encourage collectors to make their own observations of and hypotheses about mollusks, to try to prove or disprove accepted wisdom, and, perhaps, to proceed to publication.

David Freeman, longtime editor of the *Strandloper*, publication of the Conchology Society of South Africa (since 1978), passed away last June of a heart attack. He was 72. David was highly knowledgeable and precise, a widely known and widely read conchologist. An avid correspondent, he forged many bonds among conchologists worldwide. His ashes have been scattered at Cape Point where his spirit will linger, we are sure.

Robert Foster (1938-2002). We have just learned at press time that Bob Foster, owner of The Abbey Specimen Shells and noted Murex collector, passed away in late January.

In other news . . .

COA's Board of Directors holds its annual "Midyear" Board Meeting in St. Petersburg, Florida, March 8-10, at the home of COA President Betty Lipe. Directors will be coming from as far away as Brazil to attend the March 9th all-day meeting, where most of COA's annual business is conducted.



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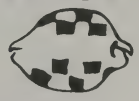
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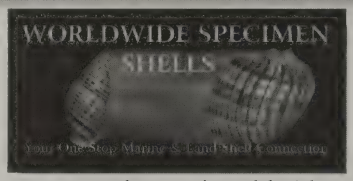

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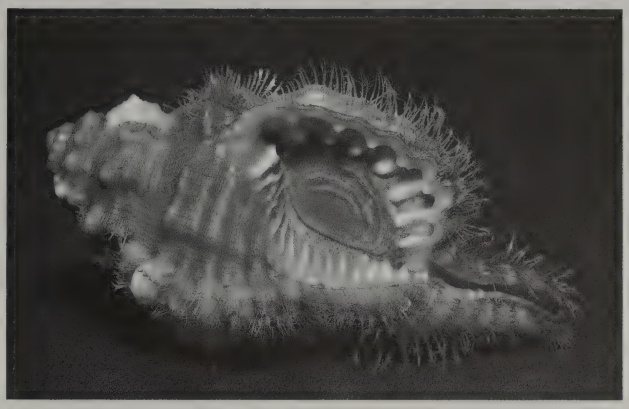
Preparing art for *American Conchologist*

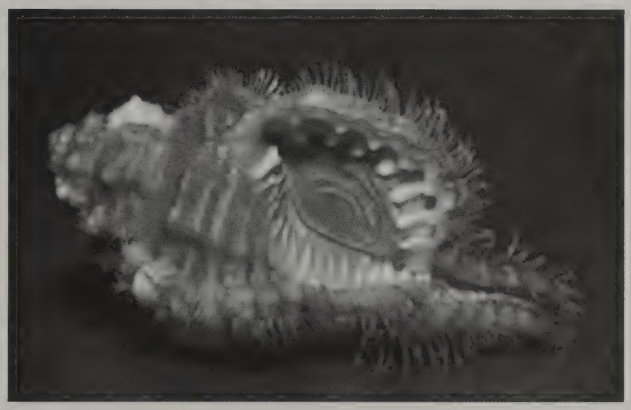
by Jim Miller, photo and design editor

A publication such as *American Conchologist* cannot exist without contributions from dedicated COA members. Naturally, along with excellent articles, our publication is also dependant upon artwork supplied either by the author or from other sources – after all, a shell magazine without quality artwork would be rather dull. However, since photos and art come from many different people with backgrounds that don't necessarily include magazine design and production, we thought it would be an excellent idea to provide members and other contributors with specific information on exactly what is required by our production staff and printer to assure we end up with high quality publication that is also visually compelling.

Naturally, the higher the quality of the original source material, the better the final printed piece. When submitting photos that are destined for color reproduction, the best originals are either high resolution digital photos (more on that in a minute), color transparencies (35mm) or original color negatives.

While we *can* use color prints, they should be professionally processed. Many "one hour photo" labs simply do not have the sophisticated equipment to produce sharp, "reproduction quality" prints. They are typically geared towards producing what could best be described as snapshots and do not offer a full range of color and sharpness.





The top photo of *Cymatium pyrum* was prepared at the print-standard of 300 pixels per inch, while the bottom photo was saved as a JPEG at the web-standard 72 pixels per inch. Hmm, notice any difference?

While, in theory, a color transparency may be capable of resolving about 6,000 distinct colors, by contrast, a color print can only reproduce in the neighborhood of 10-15% of those colors, or about 600-900 colors in total. The reason for this is quite beyond the scope of this article.

In general, if you *do* submit prints for publication, they should be as large or larger than the final printed size you anticipate. We have had 4-inch by 6-inch prints submitted to us as possible cover material. Simply put, you cannot increase the size of a photo with acceptable results. The easiest way to explain this is that every imperfection in a 4x6 print would be magnified several times over if enlarged beyond its original dimensions — even specs of dust on the print or original negative. See the moray eel photo on the next page for an excellent visual example of this. For cover photos, a minimum of 8x10 inches is required, with 11x14 being ideal.

Slides or transparencies are an excellent medium, providing an incredibly wide range of colors and lots of detail. *American Conchologist* can scan 35mm slides with superb results thanks to software such as Adobe Photoshop, the current industry standard. If you have used color negative film (Kodak Max, for example) to shoot photos, it would be best to send us the original negatives for scanning rather than prints from the negatives.

It's also a good idea to include the prints so we know which negatives to use. Alternatively, you can mark the negatives, which are usually returned from the lab in clear plastic sleeves. Use a marker (Sanford "Sharpies" are great for this task) and simply put a dot on the sleeve above the negative to be scanned.

High resolution digital photos are another excellent choice for reproduction. Most digital cameras allow you to save your shots either as JPEGs (which are compressed digitally within the camera to save space) or as TIFFs (which are uncompressed, but which can be pretty large files, up to 10 megabytes or more). Most cameras are by default set to shoot at computer resolution, which is 72 pixels per inch (ppi). However, for printing purposes, we require 155 ppi as an absolute minimum, with 300 ppi (sometimes also called dots per inch) as the ideal for maximum sharpness.

While most digital cameras, as mentioned, create files at 72 ppi, they are usually quite large. As an example, a 3.3 megapixel digital camera produces an image that's about 28 inches wide by 21 inches deep at 72 ppi. Converted to 300 ppi, that's still a respectable 6.75 inches wide by 5 inches deep.

A 3.3MP camera's JPEG mode produces a file that's usually about one megabyte compressed, but 9 megabytes when uncompressed. In any case, when sending digital images, it's always best to send us the original and let us do any necessary conversion. We can accept either Mac or PC formatted 3.5-inch diskettes, ZIP disks or CDs. If you would like to simply send photos electronically, *please* send them *individually* (this is important!) to *jim_miller@mindspring.com*. Please do not send to the editor.

It's very important to understand that 72 ppi "web quality" art is *not* acceptable. Though these may look just fine on your computer screen at five

— Continued on Page 22

Preparing artwork

— *Continued from Page 21*

or six inches wide, they will not produce acceptable results when printed. The photos on page 21 of *Cymatium pyrum* illustrate the difference between what's considered print quality (300 ppi) and web quality (72 ppi).

Line artwork or illustrations can be sent as originals, which will be scanned on our equipment. In most cases, this is the best option. When sending the original is not possible, you may scan the art on your own equipment, then send it as a digital file (via e-mail or on diskette, ZIP disk or CD). When scanning artwork with fine detail, it's always best to scan at a very high resolution. For example, a black and white line drawing should be scanned at 600 ppi or even higher — up to 1200 ppi.

The scan of a moray eel on the left was made at 100% from a fairly crisp 4 x 6 inch print. The finished piece looks pretty good, though it's not razor sharp. When the same 4 x 6 print was scanned large enough to fit on our cover, you can easily see that the moray's head is now slightly out of focus, producing an unacceptable image for publication.

You cannot scan artwork that has already been printed elsewhere. Aside from the many copyright issues to consider, printed artwork has already been converted to a series of dots at a resolution of 133 to 150 ppi. When rescanned, you will end up with what printers call a *moiré* (which is pronounced "moray" like the eel).

Finally, if you wish for your art or photos to be returned in a timely manner, please be considerate and include a self-addressed envelope.

We hope this information has been helpful. If you have any further technical questions, feel free to contact the *American Conchologist* photo and design editor at the email address below or call (850) 877-9438.

Together we can make sure *American Conchologist* will continue to be a publication that all COA members can be proud of.

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CIRCUS OF SHELLS: The GREATEST SHELL SHOW on EARTH – July 13-17, 2002

Gentle breezes, white sandy beaches, lovely sunsets, tropical ambiance – what more could you want in a setting for the 2002 Conchologists of America Convention, which will be held in Sarasota, Florida. The COA convention will be held at the Hyatt Hotel on Sarasota Bay, located downtown within a mile of excellent restaurants, lots of shops, and several wonderful shelling spots. It's a twelve-story, bayfront hotel in the heart of the art district on Florida's culture coast, seven minutes from the Sarasota-Bradenton airport and 65 minutes from the Tampa airport. The Hyatt number is; 1-800-223-1234 and the web site is *www.hyatt.com*. Please mention COA for special rates.

There are seventeen field trips to choose from at the convention this year. The schedule of events, field trips, and the registration form are included in this issue of the *American Conchologist*. Our club has planned a variety of special fun activities to please all. Five full days of programs, field trips, sales, parties, plus the day before and the day after with day-long field trips, located in our special area. Our bay area boasts many sunny days per year, and is cooled by the sea breeze in the summer. However, bring your umbrella, because Florida's natural air-conditioning (late afternoon showers) is in full swing in July.

As an added attraction our shell club Crafters will demonstrate hands on artistic shell craft sessions for a nominal charge to cover materials. Let's have a great turnout! If you are new to COA and have never been to a convention, this will be *the* occasion to get your feet wet. The Sarasota Shell Club invites you all to come and enjoy our great city, and the camaraderie of shell collectors from around the world.

HAVE YOU MADE YOUR DONATION YET? Each year all the items for auction are donated by COA members, dealers, publishers, and collectors like yourself. Proceeds from the auctions help fund the COA Grand Awards for Scholarships, the COA Grand Trophy awards presented at shell shows and the publication of the *American Conchologist*. Therefore, your donation is *very* important; it will not only help COA, but will also call attention to you as a collector or dealer. We want to make the auction the most successful to date. We request that donations arrive by mid-June, 2002. The sooner the better. Donations may be sent to: Anne Joffe, 1163 Kittiwake Circle, Sanibel, Florida 33957. Thank you in advance for your generosity.

— *Fran Schlusemann*, Publicity Chairperson, Sarasota Shell Club. Email: *HANKSFRAN@aol.com*

Conch-L

— *Continued from page 15*

historically has always held the position of 'world's largest epitoniid'!!"

Bill Frank, editor of the Jacksonville, Florida *Shell-O-Gram*, and creator and webmaster of a fine website himself, advised: "One should be very suspicious when offered a specimen 30-50% larger than a current listed world record. Also, such a large specimen would be expected to show wear and tear which would be inevitable during its lifetime. Having seen one of the fakes (probably the same one Tom mentioned earlier — but not at COA) two things immediately stood out: it was a perfect gem specimen and it was vastly larger than any previously found."

Paul again replied: "A real shell will be "hollow" all the way to the apex. A fake will only be hollow for a whorl or two, with most of the spire filled solid. I wonder if the shell is sufficiently translucent to check this using bright backlighting, rather than x-ray? This is one reason I was wondering what they are made of. It must be something pretty lightweight. Otherwise the weight of the solid specimen would be a dead giveaway."

Mique responded: "Again on the *rugosum* . . . somewhere in the dim and distant past have heard that if you take a hot needle and try to penetrate the surface . . . (somewhere it doesn't show, of course), if it smells like feathers it's probably real . . . if it smells like plastic . . . it ain't . . . maybe even a petroleum odor . . . We think its made of some acrylic." (Mique is considering naming their fabulous fake "Pseudoepitonium rubogus." The specimen isn't even a world record size fake anymore!)

Live *Epitonium rugosum* by Emmanuel Guillot de Suiderat

A Helpful Exchange on Travel Health

List member **Ellen Bulger** initiated a thread on travel precautions that will be of real interest to shellers who are planning trips to foreign parts. She wrote: "I discovered a cool site that could be a valuable resource to fellow shellers: Travel Medicine, Inc. 800/872-8633 or *www. travmed.com.*

"Years ago I took a trip with Liberty Travel to Cozumel. They plopped us into the middle of a typhoid epidemic without a word of warning. Five of the six of us got typhoid. Now I never trust anyone else to do my travel health research. I'm swooning to go to Fiji, if I can figure a way to afford it, but I do not want dengue fever which is a *serious* problem there. Typhoid in Mexico was bad enough, thank you very much. Even after all these years the memory is quite vivid and, compared to dengue, typhoid is a walk in the park.

"Travel Medicine, Inc. has the best information on travel heath issues that I have ever seen. IMHO, it blows away the *CDC* and *WHO* pages, at least for the lay person. Learn all the gnarly details about malaria and dengue! The report on Vanuatu alone reads like the outline of one of Stephen King's grimmer efforts.

"I had sought out the site to order packets of rehydration mixtures for severe diarrhea, what the WHO people call resurrection fluid . . . But I found much more. The up-to-date health information on various countries was amazing. And the products offered were pretty cool too, including a synthesized sort of pyrethrum called Permethrin for treating clothing. As mosquitos often bite through clothing, I've wondered about the effectiveness of DEET alone, which is just for skin. An insecticide on clothing helps shore up the gaps, but as an avid snorkeler & beachcomber, I still have problems to solve. Skeeters bite right through dive skins. Permethrin stays on clothing for several washings, but is toxic to marine life.

"So I ask all you world travelers, how did you address these problems on Fiji and elsewhere? My idea of a trip is not Disneyworld safe and sterile, but I would like to shell on my adventure, not spend my time writhing in febrile agony."

Karlynn Morgan in North Carolina wrote: "Ellen, another site you should check out is: *http://travel.state.gov/travel_warnings.html*. This is the U.S. State Department's *Travel Warnings & Consular Information Sheets*. Not only does this site speak to the safety of traveling in any given country, it is also full of valuable medical information that may help you plan your trip. For instance, do you need to be concerned about Malaria, food contamination, etc."

Rich Goldberg contributed a website of his own: "I find one of the best sources for a broad spectrum of travel health information is the **Centers for Disease Control (CDC)** Web site at: *http://www.cdc.gov/travel/*."

Then we heard from **Liwen Tan** in the UK: "Mozzies are unlikely if you're by the sea; they can't deal with saline conditions. It will be sand flies you have to worry about. Use loads of suntan and spray. Keep away from the aerosol stuff and go for the DEET sprays. I find that sensible clothes help as well. Trousers help, but don't go for heavy fabrics; they don't provide much more protection from bites and tend to generate more heat = sweat = more mozzie attractant.

"But it all boils down to doing as much as you can to prevent bites; I was in Kenya and Tanzania last summer with little malaria coverage; the Larium was just crazy; got more bites than you can wave a big stick at (my legs go walk abouts out of the mozzie net at night) but was lucky enough to get away with it. Contrast with someone else with daily drugs and no reported bites (yeah, right) who came down with yellow fever and malaria. Sometimes luck does play a part; but it's all about minimising risks."

Finally, **Katherine Szabo** wrote: "For once, as an archaeologist working in the Pacific, I feel I have something to contribute to these discussions! I spent two months in Papua, New Guinea earlier this year, many days' travel from the closest medical help, so have had a crash course on what to do and take. I do not know whether there are equivalents in the USA, (though there would surely have to be) but I visited the Travel Medical Doctors in Australia who specialize in vaccinating and kitting out travellers such as myself.

It entirely depends how remote you intend to be in terms of what to take with you, so the situation with local medical facilities is definitely worth investigating. The Lonely Planet guides will give a run-down of medical

— *Continued on page 25*

Some Deep Water Shells from Vietnam

by Dr. N. N. Thach

Located in Southeast Asia, Vietnam has a rather long coastline (estimated at about 3,200 km). Various shells have been collected from the mesolittoral zone (*Erosaria moneta, Clypeomorus petrosa*) to the infralittoral zone (*Lyria kurodai, Amaea magnifica*) and circumlittoral zone (*Gemmula speciosa, Latiaxis fearnleyi*). Many deepwater species were also often found.

In this brief article I would like to present some of these interesting species. Specimen numbers below match those on the color plates found on Page 25.

1. *Ficus filosa* (Sowerby III, 1892) 109 mm, collected off Phan Rang at 150 m, easily identified due to the reticulate appearance. Average size 65-90 mm, large specimen reaches 117 mm. This fig shell has no operculum and crawls quickly on sandy bottom thanks to the large foot.

2. *Conus pergrandis* (Iredale, 1937) 122 mm, collected off Nha Trang at 200 m. This rare cone is adorned by axial flammules near the shoulder and a brown spiral band at the middle of the body whorl. Average size 100-130 mm, large specimen reaches 157 mm. This cone is carnivorous and lives in sandy mud.

3. *Fulgoraria ericarum* Douté, 1997, 112 mm, trawled off Nha Trang at 100 m, characterized by the big, round apex and non-crenulate outer lip. The volute is sculptured with wavy, axial brown lines. Average size 120-150 mm, large specimen reaches 226 mm. No operculum. Habitat: mud.

4. *Perotrochus vicdani* Kosuge, 1980, 46.3 mm (diameter) X 35.8 mm (high), trawled off Quang Binh at 400-500 m. This rare slit shell is rather small, orange-colored, with many axial red streaks. Base flat and whitish.

5. *Nesiocypraea hirasei* (Roberts, 1913) 50.7 mm, collected off Nha Trang at 120 m. This cowry has produced extremities and an irregular brown dot on dorsum. Average size 40-50 mm, often found near rocky bottom.

6. *Fulgoraria rupestris* Gmelin, 1791, 93.5 mm, trawled off Nha Trang at 100 m. It is similar to *Fulgoraria ericarum* in shape and distinguished by its crenulate outer lip. Average size 70-85mm, large specimen reaches 100mm. No operculum. Habitat: mud.

7. *Marginellona gigas* (Martens, 1904) 109 mm, collected off Phan Ri at 450 m. The shell is pale brown, rather smooth with only one axial fold on the columella. No spiral cords or axial ribs. This marginellid is the largest species of the family and lives on soft bottom. A large specimen reaches about 157 mm.

8. *Ancistrolepsis vietnamensis* Goryachev & Sirenko, 1990, 73 mm, collected off Nha Trang at 150 m. Shell is of medium size, whitish pink with many strong spiral ribs. Interspaces narrow and deep. The mollusk has an operculum.

9. *Perotrochus teremachii* Kuroda, 1955, 72.5 mm (diameter) x 60 mm (high), trawled off Hochiminh City at 350-400 m. This pale yellow slit shell is larger than *Perotrochus vicdani* but less colorful. Spiral cords and fine axial lirae intersect, forming granular surface. Interior iridescent. Habitat: soft bottom.

10. *Pinna linguafelis* (Habe, 1953) 198 mm x 127 mm x 72mm, trawled off Nha Trang at 200 m. Shell large, triangular, inflated. Average length 180-200 mm, large specimen exceeds 225 mm. This bivalve is often found on gravel bottom.

11. *Tibia fusus fusus* (Linnaeus, 1758) 236 mm, collected off Nha Trang at 120 m. This slender shell resembles a pen with elongated spire and a long siphonal canal. The mollusk has a thick, black, leaf-like operculum. Average size is 130-200mm, while a large specimen exceeds 280 mm. Habitat: sandy bottom.

12. *Conus queenslandis* da Motta, 1984, 98 mm, trawled off Nha Trang 170 m. This cone has sharply angulate shoulder and concave sides. Two large brown bands are arranged spirally. Aperture narrow and white. Habitat: sandy bottom.

13. *Conus sugimotonis* Kuroda, 1928, 105 mm, trawled off Nha Trang at 200 m. This solid cone is pure white with flat spire and sharp apex. Body whorl tapers rapidly anteriorly. Average size 60-80 mm. Habitat: sandy mud.

14. *Conus stupa* (Kuroda, 1956) 96mm, collected off central Vietnam at 300 m. This rare cone was not supplied in past years. Shell is biconic with elevated spire and sculptured by a series of many small brown dots. Brown blotches occasionally appear on body whorl. Habitat: sandy mud .

15. *Conus stupella* (Kuroda, 1956) 72.5 mm, trawled off Central Vietnam at 200 m. This shell resembles the preceding species in shape but can be distinguished by the straight sides of body whorl and smaller size. This is also a collectors' favorite. Habitat: sandy mud .

16. *Galeodea leucodoma* Dall, 1907, 54.3 mm, collected off Nha Trang at 180 m. This white cassid is rather thick with lots of nodules spirally arranged. A thick outer lip borders the large and elongate aperture. Average size 40-55mm. Habitat: sandy mud.

16. *Conus orbignyi* Audouin, 1831, 81.5 mm, trawled off Nha Trang at 130m. This slender cone has long spire and many spiral grooves. Brown dots frequently arranged in spiral bands. Average size 40-50 mm. Habitat: soft bottom.

18. *Tibia powisi* (Petit, 1842) 70 mm, collected off Nha Trang at 130 m. This uncommon conch is similar in shape to *Tibia fusus* but much smaller,, whiter and sculptured by many strong white spiral ribs. The elongate-ovate aperture bears five short digits. Average size 45-55 mm, large specimen exceeds 60 mm. Habitat: sandy bottom.

19. *Guildfordia triumphans* (Philippi, 1841) 62.6 mm x 57.5 mm (including spines), trawled off Nha Trang at 150 m. This beige-bronze shell can be easily recognized by its projecting spines. Surface is covered by rows of granules. Apex low. Average size 50-60mm in diameter, large specimen reaches 70 mm. Habitat: sandy bottom.

20: *Baryspira hinomotoensis* (Yokoyama, 1922) 41.5 mm, collected off Nha Trang at 150 m. This small shell is heavily callused and sculptured with two spiral brown bands. Aperture elongate. Outer lip white. Operculum translucent and pale yellow. Average size 30-40 mm. Habitat: muddy bottom.

Other deep water species such as *Eudolium pyriforme, Latiaxis mawae, Latiaxis pilsbryi, Conus pagodus* and *Morum grande*, will be discussed in a forthcoming article.

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Conch-L

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facilities available in all major Pacific Island groups (Fiji has its own Lonely Planet Guide).

"Fiji is not malarial but dengue is indeed a problem. Deet is good as an insect repellent and you shouldn't really have to treat your clothes with anything else. If your accommodation is not air-conditioned then you will need a mosquito net, though the dengue mosquitos tend to be more active by day, so don't assume that you're safe in the heat of the day. Shots you should definitely have are Hepatitis A and B, typhoid, and a tetanus booster. These should be recorded in an international vaccination certificate. You should also carry a medical kit with you at all times with plasters, bandages etc. as well as rehydration fluid, stuff for diarrhoea and constipation, giardia treatment and, if you can, broad-spectrum antibiotic. Antibiotic ointment is also good to carry for cuts that infect with incredible speed in the tropics. If you are fairly remote or staying in a village rather than a resort, take extra supplies as you may end up doctoring the village (I had to treat the victim of a shark attack out of my first aid kit in Papua, New Guinea)!

"Be careful about drinking water, though this is often easier said than done. A good rule of thumb is to do what the locals do, and if in doubt, ask them. Travelling in the Pacific is an incredibly rewarding experience, so don't be too freaked out by all the scary information that gets bandied around. Find a travel doctor / medical center and arm yourself with information and common sense."

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Caribbean Cypraeidae

Cypraea donmoorei (Petuch, 1979). 55 mm.
130', by shrimper, off Guajira Peninsula, Colombia.

Cypraea donmoorei (Petuch, 1979). 35.5 mm. (dwarf)
130', by shrimper, off Guajira Peninsula, Colombia.

Cypraea mus (Linné, 1758). 42 mm.
5', in turtlegrass, Amuay Bay, Venezuela.

Cypraea acicularis (Gmelin, 1791). 30 mm.
280', by lobster boat, 50 miles north of Key West, FL.

Cypraea acicularis (Gmelin, 1791). 30 mm. (all white)
30', by diver, in reef at night, Utila, Bay Islands, Honduras.

Cypraea cervus (Linné, 1771). 76 mm. 3', by snorkeler,
near Tavernier Creek, ocean side of Plantation Key, FL.

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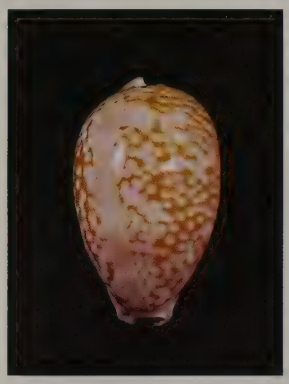
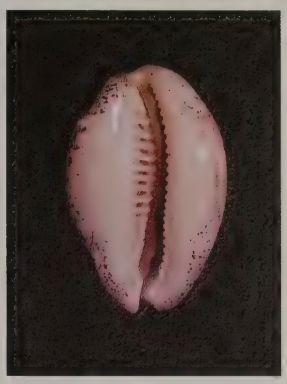
Text and photos by Kevan and Linda Sunderland

The intent of this feature is not necessarily to distinguish valid or invalid species, but to provide illustrations of taxa not always popularly available, for the information of the collector.

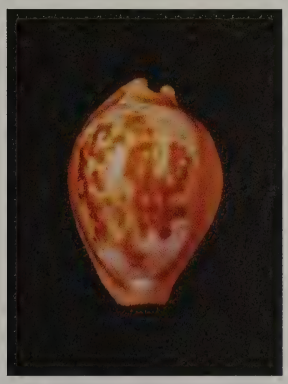


Cypraea cervus (Linné, 1771). 89 mm.
5', by snorkeler, on rocks at night, near Havana, Cuba.



Cypraea cinerea (Gmelin,1791). 30 mm.
15', by diver, Pickles Reef, off Key Largo, FL.

Cypraea cinerea (Gmelin, 1791). 30 mm. (orange)
45', by diver, near Porlamar, Margarita Island, Venezuela.



Cypraea surinamensis (Perry, 1811). 40 mm.
130', by shrimper, off Guajira Peninsula, Colombia.

Cypraea surinamensis (Perry, 1811). 29 mm.
140', by fisherman off Salvador, Brazil.

Cypraea zebra (Linné,1758). 60 mm. 3', by snorkeler, near Tavernier Creek, ocean side of Plantation Key, FL.

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"In-Tents" Scrutiny

by Bruce Neville
Plates by Tom Eichhorst

As a family, the Conidae is almost ideally suited to collecting. There are plenty of species, with an almost endless variety of color and pattern. Experts will always disagree on the exact number of valid species, but there are certainly over 500, with more being named each year. The family is full of difficult species complexes and taxonomic entanglements. The range of variation among species in size, color, pattern, texture, and shape is extensive, so for the collector, there is always a "new" cone to be added to the collection.

Even within a single species, variation can be mind-boggling. Most dealers' lists have at least a few cones. The famed Glory-of-the-Seas Cone (*Conus gloriamaris* Chemnitz, 1777) is a classic "riches-to-rags" story, but there are still plenty of fantastically expensive rarities. There are also many common, inexpensive species for the beginning collector, and many of these rank among the most attractive of all molluscs. As if that weren't enough, cone collectors can always impress their friends with macabre tales of cobra-like venom and human fatalities! Thus, it is no surprise that the cones are popular with beginning collectors and specialists alike.

Plate 1. Variation in *Conus textile* Linnaeus, 1758: 1. An openly patterned specimen like *neovicarius* da Motta, 1982, but from Okinawa, 60.6mm. 2. A specimen resembling the lectotype of *C. textile* Linnaeus, 1758. Mozambique, 80.1mm. 3. A very dark form with the tents forming vertical lines called *cholmondeleyi* Melvill, 1900. Zanzibar, 58.3mm. 4. A pattern like *verriculum* Reeve, 1843, or *concatenatus* Kiener, 1845 with the tents almost obscuring the background. Madagascar, 43.4mm. 5. A blue, finely tented pattern called *archiepiscopus* Hwass, in Bruguière, 1792, or *euetrios* Sowerby iii, 1882. Madagascar, 44.4 mm. 6. A pale, orange form called *suzannae* van Rossum, 1990. Tanzania, 48.6mm.

Among the cheap-yet-impressive cones is *Conus textile* Linnaeus, 1758, one of my personal favorites. *C. textile* serves as the archetype of a cluster of species called the "tented cones." It can truly be said that no two specimens of *C. textile* — or any of the tent cones — are exactly alike. It is not my intent in this article to provide the definitive guide to identifying the tented cones, or even to attempt to untangle the synonymy, but rather to provide an overview of the group and use them to illustrate some of the characteristics of the fascinating animals that inhabit these shells.

Several variations on the basic *C. textile* are shown in Plate 1, and this is far from the complete spectrum of variability. The species occurs throughout the Indo-Pacific Province, from Hawaii, where it is rare, to the east African coast. The variability of this single species has given rise to a multitude of varietal and subspecific names; 29 are listed in Röckel, Korn, and Kohn ("RKK," 1995). Variation in this species seems to be greatest along the east African coast, with a number of varieties occurring in the same area. Many varieties are poorly defined or extremely similar, so in many cases, I have not been able to place individual specimens into a particular named form.

A number of attempts have been made to divide the huge genus *Conus* into more manageable groups, whether subgenera or full genera. I feel that any such attempt is bound to fail until we gain a far better understanding of the animals that live in the shells, including their anatomy, ecology, and behavior. Still, there are groups of species within the genus that are obviously closely related. The tented cones are one of those groups.

In addition to the tented pattern of the shell, which has apparently arisen independently in several groups of molluscs, the tented cones share a unique "coral snake" pattern of banding on the proboscis, with a red tip and one or two blackish bands on a white proboscis (see plate 76 in RKK, 1995, the photo of a live *C. textile* on page 36 of Walls, 1979 and on page 5 of this issue). So far as is known, all are also primarily molluscivorous and share a similar radular morphology, called Type 1b by Nybakken (1990), though this radular type is also found in other groups of molluscivorous cones. The molluscan diet is not absolute, however, as *Conus aulicus* Linnaeus, 1758, has been observed to feed on small fish, and even *C. textile* itself has been known to dine on sushi from time to time. Nybakken (1990) reported that the radula of *C. omaria* Hwass, in Bruguière, 1792, undergoes a change during development that reflects a shift from vermivory during the juvenile stages to a diet of molluscs as an adult.

Within the broad group of tented cones, there are two distinct but obviously closely related groups, one centered on *C. textile* with dark axial "tex-

tile lines" in the larger pigmented areas of the pattern and one centered on *C. pennaceus* Born, 1778, with dashed salt-and-pepper spiral lines. The two groups are also said to differ in details of the protoconch, but since the protoconch is generally eroded away in the *pennaceus* group, I can't personally confirm that character.

Several species in the "textile-group," which has been called subgenus *Cylinder* Montfort, 1810, are figured in Plate 2. The rather obese outline and pattern of fine tents is fairly constant in *Conus abbas* Hwass, in Bruguière, 1792; it is restricted to the northern Indian Ocean. *C. canonicus* Hwass, in Bruguière, 1792, is extremely close to *C. textile*, and is sometimes considered another form; not all individual specimens can be assigned to one or the other species. *C. dalli* Stearns, 1873, is not generally a particularly attractive cone (a typical example is shown in figure 5a, below), but some specimens show a more elegant pattern of fine tents in discrete narrow bands, as shown in figure 5b. The pink ground color of *C. legatus* Lamarck, 1810, is diagnostic of that species. Both *C. legatus* and *C. telatus* Reeve,

Plate 2. Species allied to *Conus textile*: 1. *Conus abbas* Hwass, in Bruguière, 1792. Sri Lanka, 51.2 mm. 2. *Conus aureus* Hwass, in Bruguière, 1792. Solomon Islands, 46.7mm. 3. *Conus bengalensis* Okutani, 1968. Thailand, 112mm. 4. *Conus canonicus* Hwass, in Bruguière, 1792. Solomon Islands, 40.6mm. 5a. *Conus dalli* Stearns, 1873. Galápagos Islands, 54.1mm. 5b. *Conus dalli* Stearns, 1873. Panama, 51mm. 6. *Conus gloriamaris* Chemnitz, 1777. Philippines, 127mm. 7. *Conus legatus* Lamarck, 1810. Réunion, 42.1mm. 8. *Conus natalis* Sowerby ii, 1857-58. South Africa, 32.0mm. 9. *Conus retifer* Menke, 1829. Okinawa, 31.3mm. 10. *Conus telatus* form *telatus* Reeve, 1848. Philippines. 56.3mm. 11. *Conus telatus* form *rugosus* Lauer, 1988. Philippines. 51.9mm. 12. *Conus victoriae victoriae* Reeve, 1843. Broome, Western Australia, 48mm. 13. *Conus victoriae nodulosus* Sowerby ii, 1864. Margaret River, Western Australia, 28.9mm.

Plate 3. Species allied to Conus *pennaceus*: 1a. *Conus pennaceus* Born, 1778. Oahu, Hawaii, 43.7mm. 1b. *Conus pennaceus* Born, 1778. Kauai, Hawaii, 38.6mm. 2. *Conus pennaceus* close to *praelatus* Hwass, in Bruguière, 1792. Zanzibar, 47.9mm. 3. *Conus pennaceus behelokensis* Lauer, 1989. Madagascar, 51mm. 4. *Conus pennaceus rubiginosus* Hwass, in Bruguière, 1792. Mauritius, 47.8mm, Laura Kraussman collection. 5. *Conus pennaceus stellatus* Kiener, 1845. Kauai, Hawaii, 27.2mm. 6. *Conus aulicus* Linnaeus, 1758. Solomon Islands, 88.5mm. 7. *Conus barbieri* Raybaudi Massilia, 1995. Philippines, 19.6mm. 8. *Conus episcopatus* da Motta, 1982. American Samoa, 61.4mm. 9. *Conus magnificus* Reeve, 1843. Okinawa, 70.8mm. 10. *Conus omaria* Hwass, in Bruguière, 1792. American Samoa, 50mm.

1848, have smooth and granulose forms. The granulose form of *C. telatus* was named *C. telatus* form *rugosus* Lauer, 1988. The granulose form is now easier to obtain than the smooth form. *C. victoriae* Reeve, 1843, has two distinct forms, with and without dark bluish pigmentation. These appear to be true subspecies, with the paler *C. victoriae nodulosus* Sowerby ii, 1864, occurring farther south than the darker *C. victoriae victoriae*. The eastern Pacific *C. lucidus* Wood, 1828, is sometimes placed in this group, despite lacking a tented pattern. Nybakken (1990) also reports that *C. lucidus* species feeds on polychaetes, and its radula differs from the other tented cones, so I'm not sure that it belongs with this group.

Some species in the "*pennaceus*-group," which includes *Darioconus* Iredale, 1930, and *Regiconus* Iredale, 1930, are shown in Plate 3. *C. pennaceus* is perhaps even more variable than *C. textile*. For illustration, consider that the shells labelled 1a, 1b, and 5 were all collected in Hawaii! Kohn (1959) provides a convincing case that *C. pennaceus stellatus* Kiener, 1845, (which he called *elisae* Kiener, 1845) could be a separate species. Walls (1979) also included *C. omaria* Hwass, in Bruguière, 1792, within the limits of *C. pennaceus*, but I am following later authors and considering them separate species. I am not yet convinced that *C. magnificus* Reeve, 1843, and *C. episcopatus* da Motta, 1982, are separate species, or that I can identify all specimens if they are. The specimen figured here as *C. magnificus*

— Continued on page 30

"In-Tents" Scrutiny

— Continued from Page 29

seems to match all of the required characters of that species. The pattern of the holotype of *C. episcopatus* (see RKK, 1995, plate 62, fig. 6) is dramatically different from what is now included under that name. In fact, many of the types in this group display highly aberrant patterns.

The coherency of the group is also supported by distribution. There is no representative at all in the Atlantic Ocean. As with most other molluscs, the center of distribution is within the Indo-Pacific region. The group reaches the coast of tropical west America with *C. dalli* and as far as Port Alfred on the South African coast with *C. natalis* Sowerby ii, 1857-58.

The tented pattern is displayed by unrelated groups of shells, such as the olives and volutes, as well as unrelated cones, such as *C. marmoreus* Linnaeus, 1758, so it must be reasonably easy to generate. Pigment is laid down along the growing lip of the shell by cells in the mantle, and it is fairly easy to imagine how axial (the textile lines) or spiral (the "*pennaceus*" lines) stripes may be generated as the shell grows, but how can the complex network of tents be generated? I generally think of the pattern of tent cones as being white (or pale) tents overlaying a darker background, but in reality, it is the reverse: the pigmentation outlines triangular areas of the whitish background color. Computer scientists have modeled a system that could produce such patterns by simulating waves of stimulation and inhibition of the pigment secreting cells (Hayes, 1995). The dark lines that are generated by the model branch off in diverging pairs that intersect and cancel each other out to create the patterns we see on the shells. Another mechanism may also be present to synchronize the pigment cells so that they all stop secretion simultaneously to produce the broad posterior edges of the tents or to align tents in roughly longitudinal rows, as seen in *C. aulicus* or *C. pennaceus* (form?) *rubiginosus* Hwass, in Bruguière, 1792. It is perhaps significant that all of the tents in all of the specimens I've examined "point" toward the lip. Do they get reversed, too, in a sinistral shell? Perhaps someone fortunate enough to have a sinistral specimen of a tented cone can enlighten us on that point.

Of course, one of the characters that make cones so fascinating is their venomous sting. So far as is known, all of the tented cones are primarily molluscivores. Kohn and Waters (1966) documented fleeing behavior in two species of strombid when a *C. textile* was placed into their tank. *C. textile* is apparently something of a finicky eater, as it stung and ate several species of cowrie and even the dangerous *Conus geographus* Linnaeus, 1758, but did not attempt to sting species of either Oliva or Nassarius (Kline, 1956). Large *Cypraea tigris* Linnaeus, 1758, though affected by *C. textile* toxin, were able to survive multiple stings.

A large specimen of *C. textile* was used as the murder weapon on an episode of the old TV series, "Hawaii Five-O" (the butler did it), but are the tented cones actually dangerous to humans? *C. textile* is often cited as one of the more dangerous species and has been implicated in human fatalities (*fide* Kobayashi et al., 1981; Kohn, 1963). The venoms of *all* species of cones are complex cocktails of polypeptides with multiple actions, but the venoms of piscivorous, molluscivorous, and vermivorous species are all highly targeted toward the physiologies of their respective prey. Although Cruz et al. (1976) showed that crude *C. textile* venom had no effect on lab mice when injected intraperitoneally, they were able to demonstrate (Cruz et al., 1992) that at least some components of *C. textile* venom definitely have neurotoxic effects on mice. Fainzilber and Zlotkin (1992) reported that a single *C. textile* animal contained many more "paralytic doses" of venom than did a similarly sized piscivorous *C. striatus* Linnaeus, 1758, and Sreenivasan (2002) reports that molluscivorous cones may deliver more than one sting. Thus, although the data on toxicity of tented cones to humans is equivocal, live animals should certainly be treated with care.

I hope that this article has inspired you to follow the advice of Winston Barney in the December 2001 *American Conchologist* and spend some "quality time" with your tented cones.

My thanks to Tom Eichhorst for preparing the plates and for helpful comments on an early draft and to Laura Kraussman of Albuquerque for the loan of the specimen of rubiginosus.

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Remembering Russ Jensen

We regret to report that Russell H. Jensen, a longtime friend to shell collectors, passed away December 29, 2001 in Phoenix, Arizona after a month-long illness.

Russ became interested in shell collecting while stationed in Bermuda as an Army Staff Sergeant during World War II. He continued his interest after the war and joined the staff of the Delaware Museum of Natural History in 1971. In his thirty years of service at the museum, he played many roles, including Mollusk Collection Manager, Head of the Mollusk Department, Acting Director, and more recently, Department Head Emeritus and volunteer. His life-long work, *Marine Mollusks of Bermuda: Checklist and Bibliography*, is currently awaiting publication as DMNH Monograph Series No. 5.

Russ was always ready to share his enthusiasm for shells by assisting other collectors. He enjoyed visiting shell clubs around the country and judging shell shows. COA members will especially remember the review of mollusk cartoons Russ presented at the Banquet at the Jacksonville Convention in 1992. — *Al Chadwick*

Conchatenations

— Continued from Page 11

479 of the 926 species named in the last twenty years, a bit more than 50%. These are *Nautilus,* 123; *Avicennia*, 76; *Studies on the Fauna of Curaçao and other Caribbean Islands*, 60 (mostly in de Jong & Coomans 1988); *La Conchiglia,* 51; *Apex* and its successor *Novapex,* 41; *Iberus*, 35; *Veliger* 31; *Royal Society of New Zealand Bulletin,* 29 (all in Dell 1990); *Contributions in Science, Natural History Museum of Los Angeles County*, 26; and *Proceedings of the Biological Society of Washington,* 15.

What about the top ten individual works for number of Western Atlantic species named? These are Dall (1889), 265; Dall (1927), 213 (with another 23 named by Bartsch); Gmelin (1791), 130; d'Orbigny (1840-1853), 128; Röding (1798), 107; Petuch (1987), 106; Dall (1881), 97; Strebel (1908), 77; Lamarck (1822), 69; and d'Orbigny (1834-1847), 66. Linné (1758), just missing the top ten, comes in eleventh with 65 species. A library that held these eleven works would have 13% of the original descriptions of Western Atlantic gastropod species.

Development of the online interface for Malacolog will be an ongoing process. Goals include adding the ability to do more complex analysis online (such as some of the ones presented here involving calculations) and a facility for graphing results. Eventually Malacolog will link to museum specimen databases in order to give point data in addition to summary data. A map-driven interface for querying the database and displaying species distributions is also planned. I hope eventually to add images of many of the species and synonyms, particularly the type specimens, and perhaps even digital images of the original descriptions and illustrations.

Malacolog is being developed in parallel to and will eventually merge with other molluscan databases such as one for Indo-Pacific mollusks currently under construction in a collaboration among the Australian Museum in Sydney, the California Academy of Sciences, the Museum National d'Histoire Naturelle in Paris and my own institution. Ultimately, by expanding such collaborative efforts, it should be possible to build a database treating all of the world's molluscan species.

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California *Latiaxis*

— Continued from Page 4

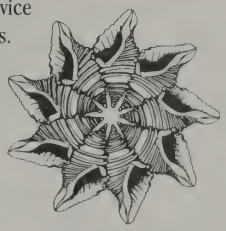
A partial list of other shells I've encountered or collected on the pipe include: *Forreria belcheri, Cancellaria cooperi, Megasurcula stearnsiana, Mitra idae, Polinices lewisii, Cypraea spadicea, Crassispira semiinflata, Pteropurpura festiva, Conus californica, Crassodoma gigantea, Trachycardium quadragenarium* and *Spisula hemphilli.* The only *Latiaxis oldroydi* I've found on the pipe is the one I collected on that Saturday morning, January 20, 2002. For me, one is enough.

I have always wanted to find a record California shell. It is extremely gratifying to find one that is so rare, in such good condition and the only member of the genus to occur here.

Email: *pkann@mediaone.net*

NEPTUNEA AWARD

Nominations are now open for the Neptunea Award. COA annually presents this coveted award in order to recognize outstanding and distinguished service to conchologists and malacologists.



Criteria for nominees are as follows:

1. Service to the organization, Conchologists of America
2. Service to the scientific interests of Conchologists of America
3. Service to the science of Malacology as it applies to conchologists

The award is intended to honor unsung heroes and people who contribute to the organization or the hobby or science without formal recognition. Thus COA officers and directors are not eligible.

To submit a nomination, send the name of the person you wish to nominate and write a detailed paragraph describing why this person deserves this award. The COA Board makes the final decision.

You may mail or e-mail this information to Past President Linda Brunner, P.O. Box 8188, Southport, FL 32409-8188 Email: *liji@panacom.com*. Nominations will be closed on May 1, 2002.

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American CONCHOLOGIST

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VOL. 30 No. 2 *JUNE 2002*

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors — to the beauty of shells, to their scientific aspects and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists and shell dealers from around the country and the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological and cultural importance to humans, and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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MEMBERSHIPS are for the calendar year, January-December, late memberships retroactive to January. **2002 DUES:** (USA) $20.00. **Postal surcharge:** $5.00 for Canada and Mexico; $10.00 for other Western Hemisphere nations; $12.00 for Europe; $15.00 for Asia, Africa and the Pacific Rim. Please pay in U.S. dollars, or with a check on a U.S. bank with Transit Enrouting and Account Numbers printed at the bottom, or with money order; make checks payable to CONCHOLOGISTS OF AMERICA. **NEW MEMBERS** apply to Doris Underwood, MEMBERSHIP DIRECTOR. **RENEWALS** go to TREASURER, Phil Dietz. **BACK ISSUES** are available from PROPERTIES DIRECTOR Hank Foglino, 4 Trent Court, Smithtown, NY 11787-1266. Prior to 1985 ? $3.00 each; 1985 to current ? $5.00 each.

MOVING? MOVED? Be sure to send all **change of address notices** to the COA Membership Director, Doris Underwood. Don't miss a single issue!

President's Message

This is the last message you will receive from me as President. I would like to compliment all of the members on their support of the Conchologists of America. I am looking forward to attending the convention in 2003 in the Tacoma area. Be sure to come to the convention to find out more about the plans for COA in Tacoma.

Looking back over the last two years, I am very proud of this organization. We have become a 501c3 organization, which means if we pass our probation period we will be a full-fledged non-profit

organization. We have come up with ways of allowing clubs to add to our scholarship funds. The Walter Sage fund continues to grow and other funds can be established. We have a convention being planned and underway for 2003 and it looks good for 2004 and even 2005. I will keep you in the dark as to where. If any club would like to host a convention for 2006, it is not to early to begin thinking about it. Hopefully a club in Florida would like to work on the convention for 2006 and a club out of the state for 2007.

Again, I have enjoyed being your president for the past two years and look forward to working with the new board in the coming year. Keep up your support and I will see you at the convention in Sarasota.

Betty Lipe

Much Is Lost

The Southwest Florida Conchologist Society was officially dissolved on March 18, 2002. All current members were notified of the dissolution by mail in April. The Post Office box was cancelled as of April. Another well known shell club is gone from us.

The Palm Beach County Shell Club has left us too. We hope someone is keeping track of the histories of these departed organizations.

We heard with great sadness that **Bob Foster** of Abbey Specimen Shells passed away this winter. Bob had been in ill health. A longtime murex collector, and one of the best known dealers in the shell world, Bob was, along with former COA Bulletin editor, Charlie Glass, co-founder of Abbey Specimen Shells. Bob was also a noted expert and much-published author on cactus and succulents.

COA's dear old friend **Kay Easland** passed away April 4.

ABOUT THE COVER

June's cover is a gorgeous red specimen of *Fasciolaria tulipa*, from the collection of Karen VanderVen, (see her article on p. 4) collected in Yucatan, photographed by Karen and photo-edited by Jim Miller.

Editorial

Over the years I have seldom used this editorial space or my editorial prerogative. I have always believed that shells and the personalities of the shelling world should predominate. But in this my last issue, I would like to claim that space and that prerogative to say goodbye.

You have been an all-consuming passion in my life for fifteen years, since January, 1987 when Rich Goldberg and Walter Sage asked me to edit what was then called *The COA Bulletin*. An editor could not ask for a more generous and supportive readership than you have given me. Your help, your ideas, articles, photography and art, your man (and woman) power, your appreciation, and your kindness and your love have carried me through many a difficult time. I cherish all that warmth and wealth more than I can ever tell you. Shellers are, indeed, very special people! Thank you so much for all you have given.

People have, on occasion, asked me how I could do all I do. Sometimes things were going so well (usually right after an issue went into the mail) that I wondered what they meant. Yet at other, more difficult times, I too wondered how I made it all work, and more worrying to me, why I was doing it! But here is the answer I always found to those questions: COA and *American Conchologist* have never failed to stretch me and to make my life so much richer. I have met such wonderful and interesting and unusual people in COA. I have visited special places at its conventions. I have encountered and enjoyed such a lot of fine and creative minds in its ranks. I have found treasured friendships among its members. I have lived experiences no other pursuit could have given me. I have had so much fun, laughed so many laughs. And I have learned so very much!

If COA's cause were not so worthwhile, its work so very important to the hobby of shell collecting in America and the world, I could not have accomplished these fifteen years. The 1990 Long Island Shell Club convention logo featured a lighthouse and the words, "Let COA Light the Way." Indeed, it was COA's beacon that inspired me to continue and to do my best. I always felt like I was working FOR something, helping enrich people's enjoyment of this very special hobby

Over these years I have seen COA and our *American Conchologist* grow in size, in influence, and in a sense of mission. I trust that, with your help, they will continue to grow in all ways. Tom Eichhorst of Albuquerque, New Mexico will be your new editor. I know you will help and support this very talented and enthusiastic man as you have always done for me, and warm his life too. Together you can make the *American Conchologist* and COA even stronger, take them down new paths to answer new challenges in shelling. In so doing, you'll continue to light the way for new shellers far into the future.

See you in Sarasota! Lynn Scheu

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Malacological Publications from the MCZ

The following unusual and interesting publications have been recently issued and are now available for purchase at the Museum of Comparative Zoology at Harvard University.

Graf, D.L. 2002. *Historical biogeography and late glacial origin of the freshwater pearly mussel (Bivalvia: Unionidae) faunas of Lake Erie, North America.* 175-212. ($7.00).

Johnson, R.I. 2002. *Albert Gallatin Wetherby: Malacology at the Cincinnati Society of Natural History and in Ohio (1843-1896).* 109-134. ($5.00).

_____. *Arthur Fairfield Gray (1855-1944), his malacological contributions.* 135-148. ($2.60).

_____. *The marvelous, monstrous, mythical, marine mollusk, Cochlea sarmatica Thevet, 1575.* 149-174. ($5.00).

_____. & W.J. Clench. 2002. *Additions and corrections to Clench and Turner, 1962. New names introduced by H.A. Pilsbry.* Published by the Department of Mollusks, Museum of Comparative Zoology, Harvard University. Pp 1-22. ($5.00).

Ordering information for these as well as other mollusk related publications available for purchase can be found on theDepartment of Mollusks, Museum of Comparative Zoology web page at http://www.mcz.harvard.edu/Departments/Mollusks/index.html

Do check out this website It is a great place to go shopping! Did you think that old classic, *Johnsonia*, was no longer available? Think again! And back issues of Occasional Papers on Mollusks…all that old stuff by Abbott and Clench and Ruth Turner and other great names in shelling. Papers by Boss, Bullock and Morris Jacobson abound. Have fun!

— Thanks to Adam J. Baldinger, Curatorial Associate, MCZ for this information.

Riding Shotgun on the Mollusk Coast: A Yucatan Shelling Adventure

Trachycardium isocardia.

by Karen VanderVen
Photographed shells from the Yucatan trip in the collection of Karen Vander Ven
Photo editing by Jim Miller

It was the note about the famous malacologists Harold and Emily Vokes that caught my eye about this Yucatan trip: trip leader Peggy Williams suggested that we review their *Distribution of Shallow-Water Marine Mollusca, Yucatan Peninsula, Mexico* listing 769 identified species from 99 Yucatan locations. Not only was this monograph in the University of Pittsburgh Library, but also I was its first borrower!

Lagoon treasures: *Cerithidea scaliformis* (Say, 1825).

Imagining myself a member of a latter-day Vokes expedition was impossible to resist. So in mid-December I joined Marion Martin from Columbia, Missouri, Donna Benise from Jensen Beach, Florida, and Ed and Beth Frayer from Phoenix, and of course Peggy, in Cancun. Our itinerary would cover both the Caribbean and Gulf coasts, including El Cuyo, Campeche, Celestun, and Isla Holbox.

Mollusk Coast? There are two books, *The Mosquito Coast*, by Paul Theroux, and *The Mangrove Coast*, by Randy Wayne White, set in Central America. Why not take literary license and dub the Yucatan Coast "The Mollusk Coast?" Read on to see whether or not the title is warranted…

Caribbean Shore

That night we had an authentic Yucatan seafood dinner at a seaside restaurant in Puerto Morelos. Next morning with Peggy at the wheel of the van, we headed south on the Caribbean coast towards Tulum. Through the waving palms and occasional resort villages, we could spot the deep blue ocean against a light blue sky. What a sense of anticipation approaching a brand new shelling spot gave us. What would we find?

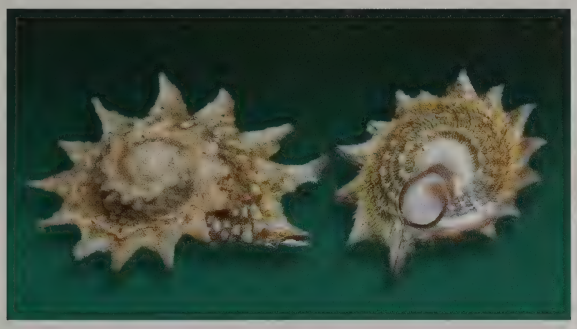
We passed a spot spelled Xel Ha, pronounced "Shell- Ha!" – as a lucky omen perhaps. Emerging on a deserted beach, we set to beach combing. Periodically I'd marvel: "Yesterday, snowy Pittsburgh; today – the tropical shore!" Truth to tell, there were few shells here, although I did scrounge up a nice *Cypraecassis testiculus.* And Beth picked up a fine *Spirula spirula* before we continued south.

***Columbella mercatoria* (Linné, 1758): stark black and white beauties from the rocks.**

After having encountered a "bridge to nowhere," we had to turn around. I spotted water sparkling through the trees on the non-ocean side. "A lagoon! I wonder what's in it?" I exclaimed. Peggy agreed to stop but said I'd probably sink in the muck. I gingerly stepped onto the sand and while march-stepping quickly to keep from sinking, I did pick up some fine *Nerita virginea.* We continued north and stopped at another mangrove-studded lagoon shore. In the shallows were dark brown auger-shaped shells. No, not *Terebra dislocata.* These were *Cerithidea scalariformis* and quite handsome with their fine sculpture and contrasting bands of lighter brown.

Our last collecting stop of the day featured rock outcroppings visible in the low tide. There were *Leucozonia leucozonia, Engina turbinella* and under just one rock, a marvelous colony of *Columbella* species in which were several distinctive *Nitida ocellata* and gorgeous *Columbella mercatoria* with distinctive white zig zag patterns slashed against a pitch black background.

We stopped at the Tulum ruin on the way back, the only Yucatan Mayan ruin right on the sea. Back at Puerto Morelos as dark set in, I plunged into the roily sea and soon rolled back in with three fresh dead, bright yellow, shiny pairs of *Tellina radiata,* and, in the grass, two live *Astraea phoebia* in good condition.

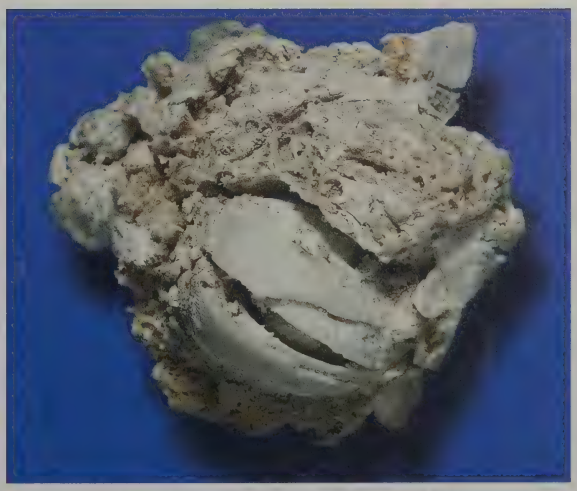


Astraea phoebia **(Röding, 1798) from the grass.**

A beach specimen of *Ficus communis* (Röding, 1798).

Beach shells from El Cuyo.

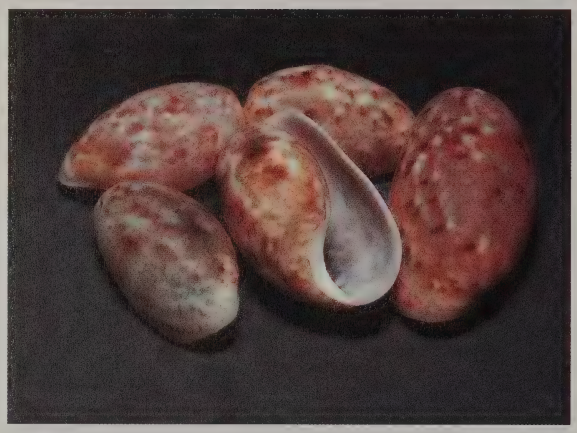
Fresh dead *Tellina radiata* Linné, 1758.



Peggy's *Rupellaria typica* (Jonas, 1844).

(Continued on page 6)

Melongena bispinosa (Philippi, 1844)
from a pile in the mangroves at El Cuyo.

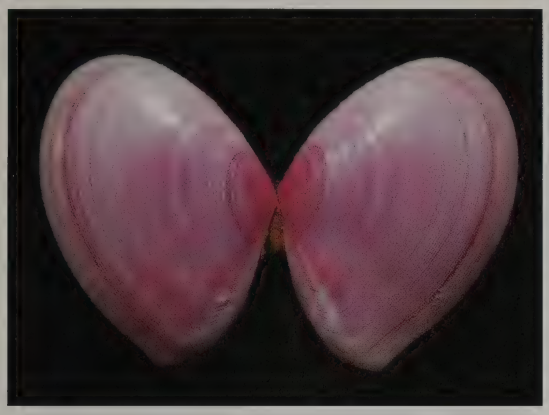


Bulla striata Bruguière, 1792 (or *Bulla occidentalis*, A. Adams, 1850) from the sand bar at Isla Holbox.

Marginellas from the drift at Cancun.

Lucina pectinata C. B, Adams, 1847:
two views of a gorgeous color form from Isla Holbox.

Conus spurius Gmelin, 1791,
purchased on Isla Holbox.



Isla Holbox *Tellina lineata* Turton, 1819; they come in white too.

***Prunum labiatum* Kiener, 1841.**

El Cuyo

An impressive sculpture of huge shells marked the crossroads leading to the western highway towards Merida where we were headed the next morning on our way to El Cuyo. There were miles of road surrounded by foliage, but periodically we slowed for the in-road barriers – "TOPES" – as we went through the center of a little village. Here we began to get our first glimpses of native life away from the resort coastline of Cancun. We occasionally saw a tire suspended from a small pole, like a mailbox, along the road. According to Peggy, this marked the pathways to somebody's home. Ubiquitous as Coca-Cola signs in each village were the dogs – skinny and gray. Women dressed in the traditional colorful Mayan dresses with intricate bodice embroidery and short skirts strolled to market. Away from the villages Ed the birdwatcher spied a "laughing falcon" in the treetops. Even the hell-for-leather shellers, who liked birds but in shelling country had other priorities, were thrilled at the chance to view this spectacular bird through binoculars. Riding shotgun in the van afforded me a special view.

***Busycon perversum* (Linné, 1758) shells from a pile at the fishing beach, Campeche.**

Finally we blew into the tiny shoreline village of El Cuyo and burst onto the beach like the Keystone Kops. I tried to get a sense of the tide lines and what might be found at each sequential level from the wave line to high up on shore. A wavy path of dreck just where foliage met sand looked promising.

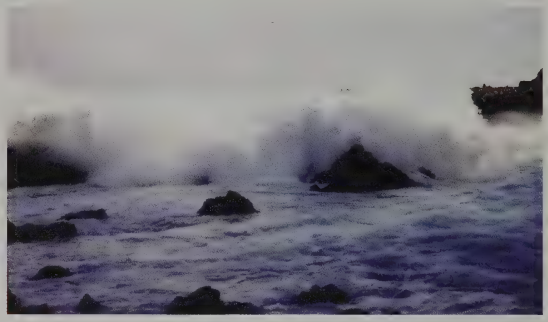
Wow! Soon I had snatched up a gorgeous orange striped *Fasciolaria tulipa*. To follow was a large dog head triton, *Cymatium caribbeaum*. There was a turnip whelk, *Busycon coarcatatum*, with its unmistakable shape. Short of being a fossil, this was a colorless skeleton. Given that turnip whelks are rare and deepwater, however, it was almost incredible just to pick one up on a beach. *Ficus communis*, in perfect condition were to be had just by stooping over.

***Conus floridanus* Gabb, 1868 from Cancun.**

(Continued on page 22)

Collecting Shells from the Navel of the World

Moai at sunset. Endemic to Easter Island.



Typical conditions along the southern coast.

by Bret K. Raines

Stepping off the plane is like stepping back through time. You immediately realize that you have come not only to another country, but also to another world. In fact, it has been only during the past thirty years or so that taking a plane to Easter Island was even an option. Although this mystical island has been inhabited by Polynesians since about 300 AD, it was not discovered by the Europeans until 1722. From that moment on, it has been a subject of intrigue and controversy. For myself, the island has evolved from being a childhood dream of a place to visit to being an obsession to learn more about its little known treasures.

The native people call the island, "Te Pito O Te Henua," which literally means "Navel of the World." However, it is probably better known as Isla de Pascua or Easter Island. The island is a Chilean possession in the southeastern Pacific (lat. 27°09' S, long. 109°26' W), about 2,000 miles off the coast of Chile. As a World Heritage Site, it is considered to be the most remote inhabited island on the planet, and it has been of interest to scientists for decades.

Mary sitting next to moai, whose bodies are buried beneath the surface. Notice the slant of the noses. Do you see a resemblance?

Although the island's anthropological and archaeological mysteries have been the subject of countless magazines, books and television programs, relatively little is known regarding the island's molluscan fauna. Of the handful of researchers, who have attempted taxonomic classification, the late Dr Harald Rehder was the most notable. In 1980, he published an outstanding monograph, in which he reported 133 species of marine molluscs. Today, published reports bring the total to approximately 180 species. Over 95% of the species are less than 10mm in size, with rates as high as 42% being endemic.

Pascahinnites pasca **(Dall, 1908). Endemic to Easter Island.**

Zafrona consobrinella **Rehder, 1980. Endemic to Easter Island.**

Admittedly, Easter Island would not normally be a shell collector's first choice for a shelling destination. With its rugged coastline, violent surf and unpredictable weather, one has to wonder why anyone would want to go there to shell. However, in 1996, I still had several species of Pectinidae missing from my collection. I knew that some species would never be available on the market, because either they were very rare, or they were known only from remote locations. One such species was *Pascahinnites pasca* (Dall, 1908), which, prior to 1975, was only known by a single left valve. Dr. Rehder successfully collected and/or identified one complete immature specimen and seventeen separate valves of this endemic species. The way I saw it, if there was any chance of obtaining this species, I would have to collect it myself.

After taking more than a year to prepare, my lovely assistant, Ms Mary Taylor, and I did not arrive on the island until late March 1998. Because we had planned our stay on the island to last over a month, our 19 bags made us appear to be on an expedition. One important note to make to my fellow world travelers. Be sure you can speak fluently the language of the host country you visit. From personal experience I can tell you that it was difficult to explain to the local Customs agent what a hooka-unit was used for, and why I needed 12 packs of batteries. Fortunately, the permit authorizing me to collect specimens from the island was written in Spanish.

I should have been ecstatic on this trip, but the many challenges we encountered right from the start (a politically correct way of saying we had nothing but problems!) made it difficult to keep a positive attitude. When only half of our bags arrived with us, the nice people at the airport said that the remaining bags would probably arrive on the next plane. Because there are "normally" two flights a week from Santiago to the island, such a delay does not sound too bad; however, on the occasions when there is no one to drop off, the plane does not land but continues on its way to Tahiti. Such was our case!

Missing bags did not really slow us down though. As it turns out, despite the island's remoteness, just about anything one might need can be found on there, except for maybe "real" coffee and peanut butter. Our hotel was not fancy, but it was clean and comfortable. Most of the time there was hot water and electricity, which we learned to appreciate very quickly. Our hosts as well as the other people of the island were friendly and always greeted us with a smile. And I will never be able to forget my very first meal on the island. Because we wasted no time in heading for the water after landing, I shortly found myself watching a local fisherman collecting sea urchins. After cracking one open on the rocks he handed half to me. Not wanting to be rude, I graciously accepted it and took a bite. I will not tell you what I thought it really tasted like, but simply say that it is an acquired taste.

Having a few days to burn, we decided to take in the sights, which is truly an understatement. I have been fortunate to have traveled all over the world, and I can say without a doubt Easter Island is the most unique place on earth. And the most awe inspiring sight on the island would have to be the quarry at Rano Raraku. This is the location where all the moai (the monolithic stone statues) surrounding the island were carved. We affectionately called it the moai factory. The largest moai is over 60 feet tall with an estimated weight of nearly 100 tons. Many moai are still patiently waiting at the "factory" to be finished, but that's another story. Our bags with the diving gear eventually arrived about the same time the weather turned bad. Go figure!

After ten days of non-stop rain, I was asking myself whose brilliant (romantic) idea it was anyway to go to Easter Island at Easter. Despite all my careful planning, I failed to take into account that I was going to the southern hemisphere and that the seasons would be the reverse of sunny southern California. Duh! However, we bravely met this challenge with our raincoats, booties and collecting gear. NOT! Actually we went out into the miserable weather because I could not stand the thought of having spent thousands of dollars on this trip, only to come back empty handed.

By the 22nd day we had collected many shells; however, we had yet to find that elusive little pecten. Needless to say, I was getting a bit perturbed. By now, we had already been to every location that Dr Rehder had shelled, plus a few more. Since the weather was fairly calm that day, we decided to return to a small, secluded beach on the northern coast. We had not been shelling for more than ten minutes before Mary started shouting, "I found one!" As I looked into the strainer, I could hardly believe my eyes. It was indeed a beautiful left valve of a *pasca*. Our luck had finally changed.

Despite the unpredictable weather, the next two weeks brought forth many more finds. We had collected examples of nearly every reported species of mollusc plus some that had never been seen before. At the end of our trip we had collected over 150 *pasca* valves, and learned enough about the species and its habitat to require a new genus for the little pectinid: *Pascahinnites* Dijkstra & Raines, 1999.

But wait! The story does not end here. Inspired by this trip and having learned many lessons, I returned to Easter Island in December 2000. The weather was sometimes still an issue, but I was prepared, and I successfully collected many more new and unreported species. In fact, with the help of Mr Michel Garcia, a resident of the island and a dive shop owner, over 90 additional species have been identified as being previously unreported. (Raines. In press.) This is a 50% increase in the number of species currently known from the island.

Although we have a fairly good foundation, more research is still required to get a true understanding of the island's molluscan fauna. Unfortunately, there may not be enough time. Tourism and pollution are taking their toll on the marine environment surrounding Easter Island. We have seen this scenario before and the outcome usually is not good. While there is still time, there needs to be a balance set between infrastructure improvements to support tourism and the protection of the environment.

I wish to thank Rich Goldberg and Guido Poppe for photographing the shells.

P.O. Box 612, Victorville, CA 92393 USA

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Raines, B. K. (In Press). *Contributions to the Knowledge of Easter Island Mollusca.*

Rehder, H. A.1980. The marine mollusks of Easter Island (Isla de Pascua) and Sala y Gomez. *Smithsonian Contribution to Zoology*. 289: 1-167.

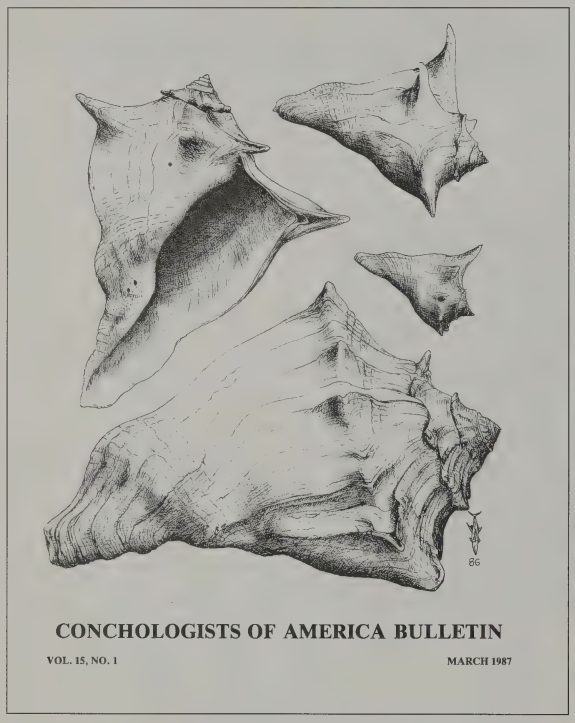
Look for the COA Index online later this year!

Valedictory for Lynn Scheu

CONCHATENATIONS
by Gary Rosenberg

Fifteen years. That's how long Lynn Scheu has been at it. Voluntarily! Fifteen years service as editor of *American Conchologist*. Half the life of COA! Lynn relinquishes that role with this issue, so I thought to salute her record of service and accomplishment by looking back at how the magazine has changed.

In 1986, a typical issue of *Conchologists of America Bulletin*, as it was then called, was entirely black and white, 16 or 20 pages, with 3 pages of advertising. There were three regular features, "California Seashells", jointly written by the editor, Charles Glass, and the managing editor, Robert Foster; "Shells in Print", by Richard Goldberg; and

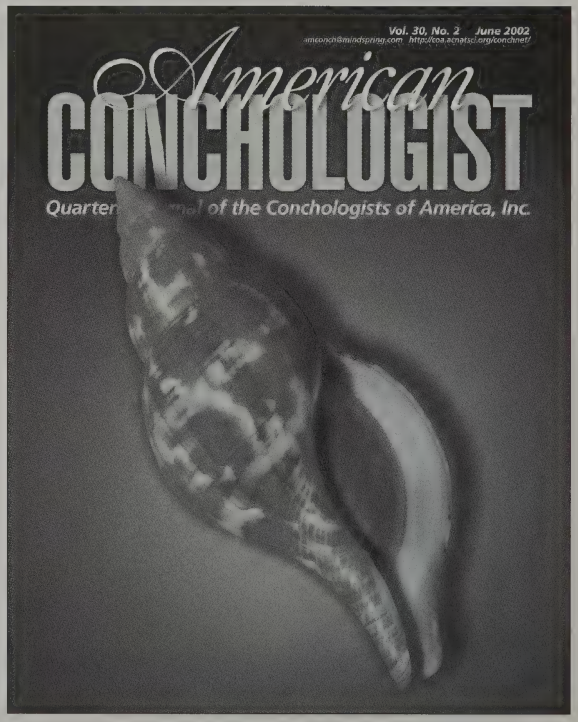


"Helpful hints for shell collectors" by Minicyp (R. H. Jones). In 2001-2002, all issues of *American Conchologist* had color covers and 32 pages, including 4 or 5 pages of advertising, and 10 to 12 pages with color pictures. There are four regular features, "The Old Shell Game" by Paul Monfils, the two-page Florida-Caribbean spread by Kevan and Linda Sunderland, a regular article on shelling in Brazil by José Coltro, and "Conchatenations" by me.

The magazine has doubled in size during Lynn's tenure. Not only that, the number of words per page has increased by a third, because Lynn uses smaller typefaces than did her predecessors. She didn't sneak this change in on us gradually, slowly shrinking the print–no, her very first issue shows that she was sneaky from the start, always trying to cram as much as possible into the allocated space. What I don't understand is where she gets all the material, especially since the number of regular features has remained almost unchanged. There's so much to read that the text sometimes leaks right out of the magazine onto the back cover! I was interim editor of the *COA Bulletin* for one issue back in 1982 (a little known fact), and it was hard to get people to volunteer to write anything.

A lot of the material comes from Lynn's persistent recruiting. From an interesting talk at a convention or a well-articulated email response to a question on Conch-L, Lynn has elicited articles. She works with recipients of student grants, coaching them on what the COA audience will find interesting. If an article isn't accompanied by photographs, Lynn will reach out to her network to find appropriate ones. Look at the wonderful cover art she has recruited, by Timmerman, Murphy, and Stephens, to name just a few; watercolors, acrylics, live animal photographs, montages, sculptures. Some items come from her own hand, a book review here, a squib to fill a gap on a page there, and what must be the hardest part, obituaries that commemorate and celebrate while bearing witness to the unexpected gaps in our lives.

Over the years a reliable source of material has been the editorial boards: every one of the current members has written for *American Conchologist*. Before Lynn, there wasn't a formal editorial board. Look at her own first editorial in volume 15, number 1: "Brand new to the job, overwhelmed, insecure, we'd barely struggled through." And there on the masthead in the next issue is the first editorial board, a distinguished group consisting of R. Tucker Abbott, Donald Dan, Charlie Glass, Richard Goldberg,



(Continued on page 19)

COA's CIRCUS OF SHELLS:

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Gentle breezes, white sandy beaches, lovely sunsets, tropical ambiance…what more could you want in a setting for the 2002 Conchologists of America Convention in Sarasota, Florida. Sarasota boasts tropical sunshine, balmy breezes, clear Gulf of Mexico waters, and island beaches covered with the world's whitest sand – by far the best that Mother Nature has to offer.

That is why, way back in the 1920's, circus magnate John Ringling and his wife Mable made this very unique area on Florida's west coast their home; today it's a trove for their art and architectural treasures. Over the years, hundreds of artists, performers, musicians, and actors, as well as patrons of the arts, have followed them.

You will find Sarasota the ideal setting for the Circus of Shells – The Greatest Shell Show on Earth – and for enjoying the best creations of both mankind and nature. Today, without question, the Sarasota area is recognized as Florida's cultural coast. Blessed with a long, proud tradition of world-class arts organizations and artists, Sarasota offers the visitor abundant opportunities to enjoy arts and culture to the fullest.

Right in the heart of the art district on Florida's Culture Coast is the COA convention venue, the Hyatt Hotel. This twelve-story convention hotel is located on gorgeous Sarasota Bay, and downtown within a mile of excellent restaurants, lots of shops, and several wonderful shelling spots It's only seven minutes from the Sarasota-Bradenton airport and 65 minutes from the Tampa airport. Contact them now to make your reservations. Phone: 1-800-223-1234; web site: www.sarasota.hyatt.com. Please mention COA for special rates.

The seventeen special field trips you can choose from are all detailed in the insert of the March 2002 American Conchologist. Our club has planned a variety of special fun activities to please all. One of our programs will examine what collectors might find on the marine collecting trips. The schedule of programs can be seen on the COA web page.http://coa.acnatsci.org/conchnet/ Then, click on Field Trips, and again click on http://community-2.webtv.net/CathyLA/2002COATrips/ for very detailed information, prices, dates, times, food information, and what to bring and wear for the trips.

You will not be disappointed with the variety of places to go, people to see, and excellent things to do while in Sarasota. Five full days of social events, programs, field trips, COA auctions, The Bourse, sales, parties, plus daylong field trips the day before the convention starts and the day after it ends are in store for you when you come to Sarasota in mid-July!

Please do not miss a very interesting opening ceremony hosted by Peggy Williams. It is one that everyone should enjoy. You can expect a lot of clowning around. And expect a lot of special opportunities all through your week at COA! Special door prizes will only be available before each program. Colin Redfern has generously donated a signed copy of his excellent book, Bahamian Shells and it will be a raffle prize, at the annual business meeting. Also, we will have a special 25 cent and 50 cent sales table for a short period just before the opening ceremonies, so it would be a good plan to arrive at the hotel by noon on Saturday, July 13 to take advantage of this sale. One more unusual attraction: our Sarasota Shell Club Crafters will demonstrate at hands-on artistic shell craft sessions for a nominal charge to cover materials.

The gala banquet on Monday evening, July 15, 2002, will offer very special entertainment. Who's the guest speaker? Everyone's asking. But it remains a closely guarded secret!

Transportation: Sarasota-Bradenton Airport is 4 miles from the Hyatt and the hotel will pick you up for a $6 round trip charge. As of January 1 the airport is serviced by Air Sunshine, ATA, Continental, Delta, NorthWest, and US Airways. Tampa International Airport (TPA) is about 60+ miles from Sarasota. The Sarasota-Tampa Express will take you to the Hyatt for $25, if you use the code "COA" (800-326-2800 or www.stexp.com) and reserve at least 3 days in advance. There is also limousine service for $65 (800-869-8137). Car rental agencies at both airports include Alamo, Avis, Budget, Dollar, Hertz, and National.

If you are driving to the convention, from I-75 take exit 39 west to its end at US 41. Turn right on US 41 to the first light (Blvd. of Arts), then left two blocks to the Hyatt. Or if coming south on US 41, turn right at 6th St. (Blvd. of the Arts); coming north, go past Ringling Causeway (which goes to Mote Aquarium) to the second light, and go left. See you at the Hyatt.

Let's have a great turnout! If you are new to COA and have never attended a convention this will be THE occasion to get your feet wet. The Sarasota Shell Club invites you all to come and enjoy our great city, and the camaraderie of shell collectors from around the world.

Fran Schlusemann Publicity Chairperson, Sarasota Shell Club,
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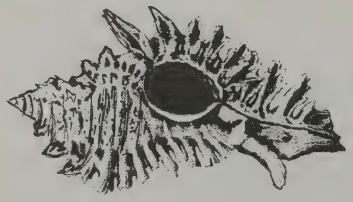

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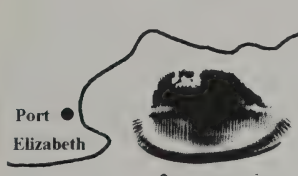

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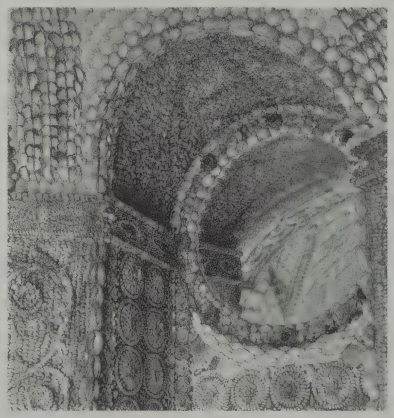
The Collector's Cabinet, the Grotto, and the Natural Philosopher: Seashells in the 18th Century

by Alan R. Kabat

Cape May, New Jersey, October 20, 2001 - A number of mollusk aficionados, joined by historians of the 18th century, recently gathered at the Victorian-era resort town at the southern tip of New Jersey, to ponder the study of mollusks in the 18th Century and the development of shell grottoes. This symposium took place at the annual meeting of the East Central chapter of the American Society for 18th Century Studies.

The seven speakers included four malacologists – Ron Cleevely (Natural History Museum, London), Alison Kay (University of Hawaii), Alan Kohn (University of Washington) and Robert Robertson (Academy of Natural Sciences, Philadelphia) and three experts on shell grottoes, all from England: Tim Knox (The National Trust), David Perman and Diana Reynell. The seven speakers gave informal and informative shop talks. Among the audience members were those with an interest in malacology and conchology of that time period, including Paul Callomon (Elle Scientific Publications), Florence Fearrington (New York), Leslie Overstreet (Smithsonian Institution Libraries), and Gary Rosenberg (Academy of Natural Sciences, Philadelphia).

The four malacologists described the fundamental transformations in the study of mollusks that began in the 18th century and continued into the 19th century. As Ron Cleevely showed through his numerous slides of the plates from rare shell books, the earliest books (such as Seba and Buonanni) were purely artistic, with the shells arranged in geometrical or anthropomorphic designs. However, by the late 1700s, many shell books treated the shells as individual objects that were described or classified in a scientific context.



Close-up of a section of an English shell grotto from the Goodwood estate in Chichester, England,
by permission of Country Life Pictures, London, England

Alan Kohn, using *Conus* as an example, demonstrated the shift from Linnaeus (1758), who emphasized the need to know the names of species, to Buffon, Lamarck and Blumenbach, who emphasized the species concept and the need to classify species into their evolutionary context. Alison Kay remarked on the sources of Linnaeus' species names of *Cypraea*, noting that Linnaeus only used a small number of preexisting common names for his species (Latin) names, with most of his names being newly formed. She also discussed the problems with the proliferating usage of common names, which cause confusion when a single common name is inconsistently applied to multiple species, or a single species is known by multiple common names.

Robert Robertson discussed a variety of topics, but focused on Rumphius, the remarkable naturalist who lived in Ambon (Amboina), Indonesia. Rumphius was an excellent observer whose treatise on the marine fauna of Ambon (published in 1705) has numerous accurate and detailed descriptions of the habits and ecology of the mollusks, crustaceans, echinoderms, and other invertebrates (Beekman, 1999; Strack, 1993: 11-13). Robertson noted that Rumphius erred in describing how the *Nautilus*, with its chambered shell, is able to swim. Kabat & Boss (in prep.) discussed the overlooked paper by Willey (1896: 146-147) who concluded that Rumphius did not observe living specimens of this deep-water genus and just repeated the descriptions provided by the local Malay fisherman, who lacked Rumphius' ability to describe this phenomenon in a biologically accurate manner. Hence, Rumphius made this unfortunate and atypical error.

Shell grottoes, to those who have never experienced them, will generate mixed reactions in their beholders. To some, this artistic and architectural use of shells will generate awe and inspiration. Others may despair or become cynical at this use of shells. The well-known literary figure Samuel Johnson [1709-1784], upon being asked by the owner of a shell grotto if he thought that her grotto would be a "pretty, cool habitation in summer" notoriously replied "I think it would, Madam – for a toad" (Knox, 1999: 48).

What is a shell grotto? As the three speakers on this subject demonstrated through their slides of extant and now-vanished shell grottoes, there is no one type or design, but a variety of approaches. Shell grottoes got their start in Italy, but their greatest development appears to have occurred in England in the 18th century, and an understanding of shell grottoes is helpful for appreciating the artistic and literary culture of England in those times. Some grottoes were designed as outdoor rooms or enclosures, others as underground catacombs, and yet others were incorporated into the design of rooms in country homes.

Typically, the walls and ceiling of a shell grotto will have hundreds or thousands of shells, often combined with rocks, fossils (including petrified wood), and crystals, all inlaid into masonry. Those that are above ground will usually have the shells carefully arranged into symmetrical or geometrical patterns, sometimes including shell sculptures of deities and animals from Greek mythology. In contrast, underground shell grottoes or catacombs often have their shells randomly and chaotically arranged, to evoke the underworld. Some even have fake stalactites, composed of hundreds of small shells and rock chips, which resembled real stalactites from afar. Yet others had floors made from polished horse teeth and pig knucklebones, carefully arranged like small tiles.

Originally, European shell grottoes used local shells from the English Channel and the Mediterranean Sea. In particular, grotto designers favored

the shells of *Haliotis* and *Mytilus*, with their shiny interiors. As the British explored the Caribbean Sea, its colorful shells – notably those of *Strombus*, the queen conch – became incorporated into English grottoes. The explorations into the Indian and tropical Pacific oceans also became a source for exotic shells, especially *Tridacna*, the giant clams, which were used for waterworks within the grottoes.

Two of the speakers, Mr. Perman and Ms. Reynell, have devoted much of their professional careers to the restoration of shell grottoes. Not surprisingly, centuries of exposure to the damp English weather and air pollution from coal furnaces have caused the shells in outdoor grottoes to become begrimed and irreparably eroded. Hence restoring a shell grotto is a substantial project, requiring hundreds of hours of labor and tens of thousands of replacement shells. Since the original shells themselves cannot be restored or repaired, they usually have to be replaced. The restorers attempt to replicate the original geometrical patterns. A single 10" x 10" rosette, which Ms. Reynell brought to this meeting, contains about 500 to 600 small shells, so it would take countless thousands of shells to restore a room-size grotto. Ms. Reynell has traveled to Cuba, where the local labor to collect shells is inexpensive, in order to obtain the vast quantities of colorful shells required for her projects. For the reader who desires to learn more about shell grottoes, I recommend the following publications as starting points: Jones (1974); Knox (1999); and Mauriès (1994). All told, it was an interesting and thought-provoking session.

2401 Calvery Street, N.W. #513, Washington, D.C. 20008-2669.
Tel. (202) 319-0082

Further reading:

Beekman, E. M. (translated and edited). 1999. *The Ambonese Curiosity Cabinet* (by Georgius Everhardus Rumphius). New Haven: Yale University Press. cxii + 567 pp.

Jones, B. 1974. *Follies & Grottoes*. Second Edition. London: Constable. xx + 459 pp.

Knox, T. 1999. "Complicated beauties: The artificial grotto in England, c. 1600 to the present day." Pages 48-60, in I.L.

Ballerini & L.M. Medri (eds.), *Artifici d'Acqui e Giardini: La Cultura delle Grotte e dei ninfei in Italia e in Europa.* Florence: Centro Di. 422 pp.

Mauriès, P. 1994. *Shell Shock: Conchological Curiosities* (translated from the French, *Coquillages et rocailles*). New York: Thames & Hudson. 112 pp.

Strack, H. 1993. "Results of the Rumphius Biohistorical Expedition to Ambon (1990). Part 1. General account and list of stations." *Zoologische Verhandelingen* (Leiden), 289: 1-72, pls. 1-4.

Willey, A. 1896. "Letters from New Guinea on *Nautilus* and some other organisms." *Quarterly Journal of Microscopical Science, 39* (2): 145-180.

Australia in 2004?!!

The Malacological Society of Australasia's Fifth Australian National Shell Show is already in the planning stages, says Kev Lamprell, noted Australian collector and author (*Bivalves of Australia, Volumes 1* and *2*). Make your plans now so that you won't miss this exciting event!

The show will be held Friday 19 through Sunday 21, March, 2004. Lots of dealers (dealer enquiries are welcome), a shell show and of course, that obligatory and much anticipated shell dinner are planned so far. Local field trips are in the planning stage. You'll want to make your plans early for this great international event.

This year's show (the Fourth Australian National Shell Show) in Brisbane, hosted by the Queensland Branch members, was a smash! Over twenty shell dealers were there, from Australia and around the world, including U.S.A.'s own Larry Strange and COA's Publicity Chairman Jose Coltro of Femorale in Brazil. Australian book dealer and Conch-L and COA member Patty Jansen was there too, with stacks of her paper treasures to sell. The raffles were stupendous, and Neville Colemen, Dr. John Stanisic, and Dr. Peter Duncan and others spoke on such various topics as live cone shells and giant land shells of Australia. Definitely, "a good time was had by all!"

The 2004 show will be held at the Morphettville Function Centre (Phar Lap Room) at the Morphettville Race Course. Morphett Road, Morphettville 5043, South Australia. Kev tells us that the Phar Lap Room is a perfect venue for this third national show, air conditioned, carpeted, with ample natural lighting, and panoramic views to the Adelaide Hills. There's plenty of parking for your rental car.

For more information contact Wayne Rumball, Ph. (08) 8381 3987 FAX. (08) 8387 4956 or Peter Hunt, Ph. (08) 8387 6492 E-Mail hunt.trottpk@chariot.net.au See you in Adelaide?

Ocean Chemistry

The pH (For you non-chemistry types, that's the acid versus alkaline composition) of Ice Age oceans 20,000 years ago and that of today's oceans are nearly the same, thanks to seashells! Shells act as buffers against chemical change. As a part of a climatic study, a research team at NOAA has determined that, even though the Ice Age atmosphere had 30% less carbon dioxide than today's atmosphere, there was virtually no effect on the seas. It seems that all those old shells lying about on the sea bottom act as giant antacid tablets for the oceans, reducing the acidity if it gets too high, thus maintaining stability for the chemistry of seawater in spite of atmospheric fluctuations in pH. They believe that the seawater may actually help lower the atmospheric carbon dioxide as well.

—From information in an ENS News article March 11, 2002
Thanks to Leslie Crncovic for posting it to Conch-L

Flowers to.....

Fay Mucha who has had cataract surgery brought on by cortisone treatments.

Jim Vunkannon who is having knee surgery.

Phyllis Diegel who has had double knee replacement surgery.

Betty Muirhead who suffered injuries in a fall.

Doug Wolf who, we hear, has been ill.

We hope you are all feeling much better by the time you read this!

Now for some good news: Herb Young is home after a recent four days in the hospital. Herb holds the record for attending the most COA conventions.

SCUM VI: Southern California Unified Malacologists

by Lindsey T. Groves

Twenty-seven professional, amateur, and student malacologists and paleontologists attended the 6th annual gathering of Southern California Unified Malacologists (SCUM) at the Santa Barbara Museum of Natural History, Santa Barbara, CA, Saturday Jan. 26, 2002. This informal group meets annually to facilitate contact and keep members informed of research activities and opportunities. Towards keeping SCUM informal, it has no dues, officers, or publications. It is hoped that the continuing success of such groups as SCUM, Bay Area Malacologists (BAM), and Mid-Atlantic Malacologists (MAM) will encourage other regional groups of malacologists and paleontologists.

SCUM Host Eric Hochberg welcomed the group and and updated everyone on recent happenings. Members were given the opportunity to present current mollusk related research and/or activities. Numerous discussions and comments resulted from many of the presentations. SCUM VII will be hosted by Ms. Carol Stadum at the Laguna Hills Community Center, Laguna Hills, CA in January 2003.

SCUM VI participants and their respective interests and/or activities:

Yvonne Albi (Conch. Club So. Calif.): Currently researching the bursid *Crossata californica* (Hinds, 1843) and its paleontology and biogeography.

Kelvin Barwick (City of San Diego): Studying benthic and epibenthic samples from 30 to 600 feet, from Del Mar, California to Tijuana, México, particularly near sewer outfalls.

Don Cadien (Long Beach Sanitation Dist.): Has participated in a regional monitoring program yielding material for research projects in southern California, particularly that of SCAMIT (Southern California Association of Marine Invertebrate Taxonomists).

Doug Eernisse (Calif. St. Univ., Fullerton): Continues worldwide chiton database with images and chiton phylogeny (are aplacophorans chitons without plates?). Also researching fossil chitons from Ordovician rocks of Wisconsin.

George Kennedy (Brian F. Smith & Assoc., Poway, CA): Continues his research of Pleistocene marine terraces of California.

Daniel Geiger (Nat. Hist. Mus. L.A. Co.): Recently traveled to Tahiti, Fiji, Hawaii, and Australia collecting scisurellid gastropods and he will be describing several new species from Easter Id. and Australia. Continues research on fissurellid gastropod phylogeny.

Jeff Goddard (Univ. Calif. Santa Barbara): Jeff is studying geographic patterns and developmental modes of opisthobranchs, particularly planktotrophic and lecithotropic species vs. direct developing species.

Lindsey Groves (Nat. Hist. Mus L.A. Co.): Fossil cowry research and a the companion volume to Keen & Bentson's (1944) *Check List of California Tertiary Marine Mollusca*.

Carole Hertz (San Diego Shell Club): Continues as editor of *The Festivus* (San Diego Shell Club publication), which recently published Kirstie Kaiser's volume on mollusks of Isla Malpelo, Colombia as a supplement. Reported that the marine invertebrates department of the San Diego Natural History Museum has reopened.

Eric Hochberg (Santa Barbara Mus. Nat. Hist.): Currently studying shallow water octopods from México to Panamá with Mike Sweeney (USNM). There are at least 22 species (6 new), 3 new genera, and 5 species of uncertain affinity.

FRONT ROW: Jeff Tupen, Yvonne Albi. 2ND ROW (L to R): Kathy Kalohi, LouElla Saul, Margaret Mulliner, Bob Stanton , Angel Valdes, Paul Valentich Scott . 3RD ROW (L to R): Dave Mulliner, Jim McLean, Carole Hertz, Daniel Geiger, Doug Eernisse, Hank Chaney, Kelvin Barwick. 4TH ROW: Don Cadien , Jules Hertz , Phil Liff-Grief, George Kennedy , Lindsey Groves, Eric Hochberg, Barbara Chaney, Ron Velarde, Roger Seapy. *Attended SCUM VI but not in picture: Jeff Goddard, Patricia Sadeghian, Jeremy Wiggins.

Phil Liff-Grief (Pacific Shell Club): Phil reported on a recent trip to Oahu, Hawai to observe populations of native terrestrial treesnails. Rats, rather than introduced species such as *Euglandina rosea*, are more of a problem to the native snails.

Jim McLean (Nat. Hist. Mus. L.A. Co. Ret'd): Jim continues work on volumes on North Pacific shelled gastropods with monetary help from Packard Foundation.

Dave Mulliner (San Diego Shell Club): Continues his top-notch photography of mollusks, particularly the micro groups.

LouElla Saul (Nat. Hist. Mus. L.A. Co.): Continues research of Cretaceous mollusks and Miocene argonauts.

Paul Valentich Scott (Santa Barbara Mus. Nat. Hist.): Continues research on commensal bivalve populations of Hong Kong, particularly mollusk/host associations.

Roger Seapy (Calif. State University, Fullerton): Announced that WSM will meet 20-24 July in Pacific Grove, CA with 3 symposia. Continues with heteropod research.

Bob Stanton (Nat. Hist. Mus. L.A. Co.): Currently curating Pliocene invertebrates from the Kettleman Hills, Kings Co., CA into the LACM Invertebrate Paleontology collection.

Jeff Tupen (Morro Group): Continues research on *Rumina decollata* (Linné, 1758) including prey size and species selection (especially on *Helix* and *Helminthoglypta* species) in San Luis Obispo Co., California.

Ángel Valdés (Nat. Hist. Mus. L.A. Co.): Researching shelled opisthobranchs of New Caledonia; helped to obtain NSF grant to curate orphaned collections now at LACM.

Also present but not reporting were **Barbara Chaney, Hank Chaney, Kathy Kalohi, Jules Hertz, Margaret Mulliner, Patricia Sadeghian, Ron Velarde**, and **Jeremy Wiggins.**

2002 SUMMER & FALL SHELL SHOWS AND MEETINGS

by Donald Dan, COA Trophy Director

Jul. 23-28 Oregon Shell Show, Portland, OR
Oregon Museum of Science & Industry, Portland
Maxine Hale, 347 N.E. 136 Avenue
Portland, OR 97230-3308 (503) 253-5379

Jul. 6 - 7 Jacksonville Shell Show, Jacksonville Beach, FL
Brampton Inn, 1201 N. First Street, Jacksonville Beach
Carol Rishel, 2115 Beach Avenue,
Atlantic Beach, FL 32233 (904) 247-7876
E-mail: rrishel@earthlink.net

Jul. 13-14 Keppel Bay Shell Show, Yeppoon, Queensland, Australia
Jean M. Offord, 277 McDougall St.,
N. Rockhampton, Qld. 4701, Australia (7) 4928-3509

Jul. 13-17 Conchologists of America Annual Convention,
Sarasota, Florida
The Hyatt Hotel, 1000 Boulevard of the Arts, Sarasota
Peggy Williams, P.O. Box 575, Tallevast, FL 34270 (941) 355-2291
E-mail: shellelegant@mindspring.com

Jul. 20-21 Townsville Shell Show, Townsville,
Queensland, Australia
Cutharinga Bowls Club on Harold Street, West End
Glenda Rowse, 19 Farrell Street
Kirwan 4814, Queensland, Australia (7) 47 73 28 17

Aug. 3 - 7 American Malacological Society,
Charleston, S. Carolina
College of Charleston's Lightsey Conference Center
Dr. Robert T. Dillon, Jr., AMS President
Dept. of Biology, College of Charleston
Charleston, SC 29424 (843) 953-8087
E-mail: dillonr@cofc.edu
http://www.cofc.edu/~dillonr/AMS2002.htm

Aug. 16-18 Jersey Cape Shell Show, Stone Harbor, New Jersey
Wetlands Institute, Stone Harbor
Jersey Cape Shell Club, P.O. Box 124
Stone Harbor, NJ 08247 (609) 653-8017

Sept. 13-15 North Carolina Shell Show, Pine Knoll Shores, NC
North Carolina Aquarium at Pine Knoll Shores
Ann Buddenhagen, 804 Westwood Drive
Raleigh, NC 27607 (919) 787-7103
E-mail: pabjetster@aol.com

Sept. 14-15 International Shells & Fossils Bourse,
Ottmarsheim, France
Salle Polyvalente, Rue de la Priscine
Michel Rioual, 2 Rue des Vergers
68490 Ottmarsheim, France (3) 89-26-16-43

Oct. 4 - 6 Annual German Shell Fair, Lohr, Germany
Klaus Kittel, Sonnenrain 10
D-97859 Wiesthal, Germany Phone & fax: (6020) 2353
E-mail: Klaus kittel@hotmail.com

Oct. 26 British Shell Collectors' Club Shell Show,
London, England
Napier Hall, Hide Place & Vincent Street
Kevin Brown, 12 Grainger Road
Isleworth, Middlesex TW7 6PQ, England (181) 568-8333

Oct. 26-27 Sea Shell Searchers Shell Show, Lake Jackson, Texas
The Lake Jackson Civic Center
Wanda Coker, 332 Banyan
Lake Jackson, Texas 77566 (979)297-0852
E-mail: sdcoker@brazosport.cc.tx.us

Nov. 2 - 3 Philadelphia Shell Show, Philadelphia, PA
Academy of Natural Sciences, Parkway & 19th St.
Al Schilling, 419 Linden Ave.
Glenside, PA 19038 (215) 886-5807
E-mail: alsch@bellatlantic.net

Nov. 9-10 Prague Shell Show, Prague, Czech Republic
Mensa van de Economische Universiteit, Italská Str., Prague
Jaroslav Derka, Holeckova 51/370
15000 Praha 5, Czech Republic Tel. 42 (2) 5731 6246
E-mail: jderka@volny.cz

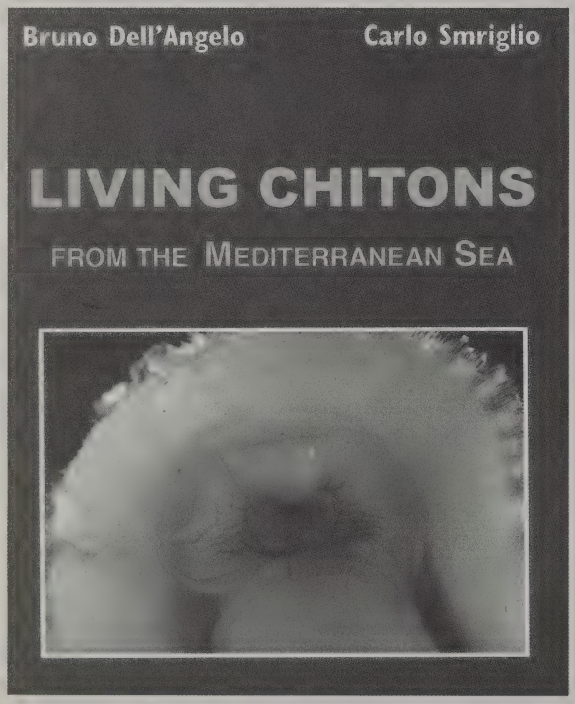
6704 Overlook Drive, Ft. Myers, FL 33919, U.S.A. Tel. and Fax: (239) 481-6704 E-mail: *donaldan@aol.com*

COA BOOK REVIEW

Living Chitons from the Mediterranean Sea *by Bruno Dell'Angelo and Carlo Smriglio. Published by Evolver S.r.l., Rome 2001. 255 pages, 65 b/w plates, 9 b/w text figs. 121 color figs. $100. U.S. ISBN # 88-8299-007-9*

Leading off with an introduction by Philippe Bouchet, this guide to the 29 species of Polyplacophora in Mediterranean waters is a must for chiton collectors. These little armadillos of the sea account for only one percent of the molluscan diversity of the world, 850 valid species, says Bouchet, but their numbers are growing as they are studied more. Some 20% of the known species have been discovered in the past 20 years. And in the Mediterranean, that number has grown by 31% in that time.

The opening chapters are the obligatory explanation and description of the shell morphology and animal anatomy, biology and ecology of the group with a discussion of the history and systematics. No shell guidebook today would be considered complete without them. They are accompanied by the first five plates (3 color), which are historical illustrations of the chitons, from Poli, 1791 through the Russian Yakovleva, 1952.



This reader finds the paragraphing conventions observed (or not observed!) in these introductory chapters very difficult to follow. The new no-indent style is followed, but the usually accompanying convention of skipping a line is not. The result is that the left margin appears very dense and no white space is left to guide the eye.

A very helpful chiton-specialized glossary, serves as a guide to chiton anatomy for the novice and the experienced collector of the group. Did you know that "aesthetes" were something other than avid and single-minded pursuers of beauty? Aptly enough, they are clusters of nerve cells. ..a case of a very interesting shift back to the original meaning of the word! It comes from the Greek *aisthētikos*, meaning "of sense perception." More chiton words to know: mucro, jugal sinus, and girdle.

The systematics section for the 29 species, the real point of it for most collectors, follows. Family, genera and subgenera discussions are complemented by a comparative chart in cases where the family contains more than just a few species. This very helpful feature should be incorporated in more monographs! This reader enjoyed it in the Lorenz and Hubert cowry book too!

For each species, all the usual topics are covered, synonymy, type material, original description, description, some very interesting notes, habitat and distribution, and the fossil findings are included. Immediately following or within the discussion of each species is the plate or plates, multi-photo illustrations of the shell and salient features. Many of these photos of tiny and microscopic features are made using the scanning electron microscope, not so useful for ID for the average collector, but invaluable for examination of some minute characteristics that may differentiate species. (Yes, those aesthetes are pictured, both the macro and micro varieties.)

Following the systematics section is a color portfolio of all the species in dorsal view, and some species in lateral and flexed views as well, to show important characters.

Sixteen pages of chiton references are followed by an excellent chart-style index, listing species, author and year, genus, major synonyms and page references. This chart format for an index, usually an eye-bender in small print, makes it very easy to use indeed. So does the able translation from the Italian by the recently deceased Guglielmo Biraghi, Andrea Biddittu and John Wolff. An attractive creation, the book has nicely designed pages, a great close-up look at the face of a polyplacophoran on the cover, and the usual (these days) perfect binding. A must for any good molluscan library.

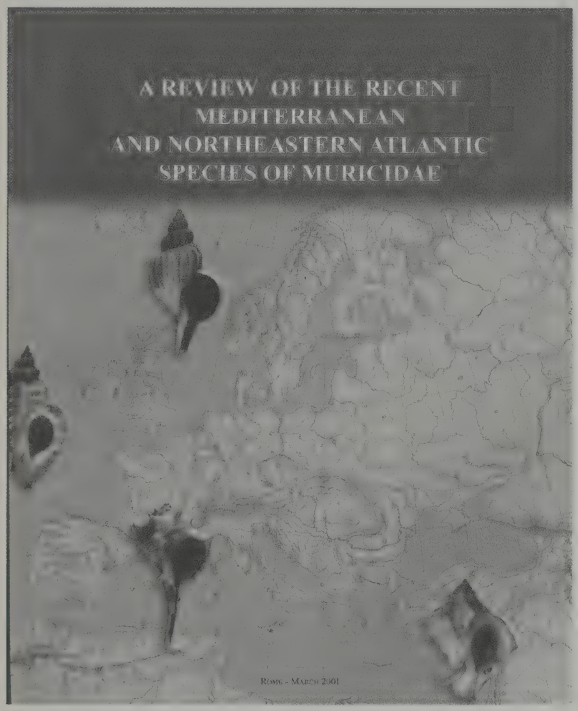
A Review of the recent Mediterranean and Northeastern Atlantic Muricidae by R. Houart *Published by Evolver S.r.l. Rome, 2001. 228 pages, 526 figs. $75.00. U.S. ISBN # 88-8299-006-0*

The name Roland Houart has become a household word to fans of the Muricidae. With the retirement of Emily Vokes, Roland's is the advice we seek to name, order, and understand our muricids, from *Bolinus* to *Trophon*. Fortunately, he is prolific, for so are the Murex. He has recently produced a monograph on the often over-worked but seldom less-than-fascinating taxa of the Mediterranean and northeastern Atlantic.

Therein, Houart recognizes sixty species and subspecies from European waters, but describes only 53 of them in this work. Six of the excluded species are West African, dealt with in previous works (*Bolinus cornutus* (Linné, 1758), *Hexaplex duplex* (Röding, 1798), ?*Hexaplex saharicus saharicus* (Locard, 1897), ?*Pterynotus leucas* (Fischer, 1897), *Murexiella bojadorensis* (Locard, 1897), and *Pagodula fraseri* (Knudsen, 1956))and one is a Caribbean species reported from the Canary Islands (*Murexiella hidalgoi* (Crosse, 1869)). Eight of the species are introduced: three of these likely came through the Suez Canal from the Red Sea. Because of the cooler waters in the region, trophonines and ocenebrines predominate: included are 10 species of Muricinae, 19 species and a subspecies of Ocenebrinae, 2 Muricopsinae, 4 Rapaninae, 3 Ergalataxinae, 1 Typhinae, and 13 Trophoninae.

Houart describes one new trophonine species, *Pagodula parechinata*

from the Canary Islands, and a new subspecies of *Ocenebra aciculata*, *O. e. exilis* from Tunisia. Of the former, Houart says, "For a long time I hesitated to describe this new species because of the highly variable shell morphology of *Pagodula echinata* [Keiner, 1840]. However, the differences ... seem sufficient to separate the two taxa. Moreover, to my knowledge, this form was never recorded before, and it seems to live at greater depths than *P. echinata*." The differences he notes are a much larger size (up to 35 mm vs. up to 52.8 mm), broader teleoconch whorls, relatively broader siphonal canal, non-flattened, short, broadly open shoulder spines, and smooth protoconch whorls.



Following an abstract in four languages is a brief introductory section in which Houart suggests that the best way to use the book is to add remarks, suggestions and map localities from one's own collection and communicate them to the author for the benefit of future studies. Also included in the Introduction are the conventions of synonymy, notes on the studied area and distribution, and a division of the studied area into "sectors," for which he includes a map and species list.

The remainder of the book (except for a concluding 9 pages of references and an index) is devoted to the Systematic account. Discussion of each Subfamily and Genus is clear, welcome, and to the point. For instance, a very lengthy synonymy, revised classification, and discussion of the much-confused *Hexaplex* is included here. Each species entry in the taxonomically and then alphabetically ordered account consists of synonyms (often lengthy lists for these much-studied Mediterranean shells), description, distribution, and remarks. Each account is enhanced by a very generous inclusion of SEM photos of radulae, by drawings of sculpture, apertures, protoconchs, opercula, and other features to illustrate differences and features of shell morphology, and by distribution maps. Types are pictured in black and white within the species accounts so that they are handy to the descriptions (and a few lectotypes are designated). Following the systematic accounts are a series (Figs. 159-205) of SEM photos of protoconchs. There follows about 320 usually clear and color photos of the 53 species. Twenty-nine of them are *Bolinus brandaris* in all its various guises, spinose, bent, horned, ribbed, bent, and wonderful! Nineteen figures depict *Hexaplex pecchiolanus*, most of them the strange form found in the Iskenderun Gulf in Turkey in which the spines all oddly turn toward the aperture. (*Hexaplex chicoreus* from a few areas in the Philippines do this trick too.)

This is a well laid-out book, easy to use. One feature that this reader appreciates is the consecutive numbering of all color photos, black and white photos, SEMs, drawings, and maps. This convenience eliminates much confusion about just what is where.

Some New Books to Look For

Tropical Deep-Sea Benthos Volume 22, edited by Philippe Bouchet and Bruce Marshall (Publications Scientifiques du Museum Paris, 2001), contains twelve articles representing the five main classes of mollusks from the deep waters of the world, with emphasis on the Indo-Pacific. Some of the authors: Bouchet, Dijkstra, Dolin, Houart, Lamprell and Marshall.

Monograph of the living Zoila: A fascinating group of Australian endemic cowries by Felix Lorenz, Conchbooks, Hackenheim, Germany. Foreword by Lindsey Groves. Deals with the 19 recent species and subspecies, including the description of a new subspecies of this fascinating group.

Valedictory for Lynn Scheu *(Continued from page 10)*

and Walter Sage. Perhaps she assembled the board because she thought she needed help editing. But in my experience, her editor's instincts are finely honed. She knows how to excise a few words or add a note of clarity without changing a writer's style or meaning. In practice she uses the board members not only as writers, but also for moral support, because that quotation sums up how Lynn has often felt, despite, or perhaps because of, the growth and changes she has shepherded: "overwhelmed...."

Of course not all the changes are Lynn's doing alone. All of those writers and artists and photographers and advisers have volunteered their efforts. Over the years, COA's officers and boards of directors have increased support for our flagship journal, to the benefit of both. Technology has changed dramatically since 1987, when personal computers were a novelty and memory was measured in kilobytes, allowing a sophistication of production then undreamt. Lynn's devotion to *American Conchologist* has driven her to keep up with technology, and to fight for the resources to employ it. She has been the nexus of all that volunteer activity, and has "barely struggled through" in most remarkable fashion!

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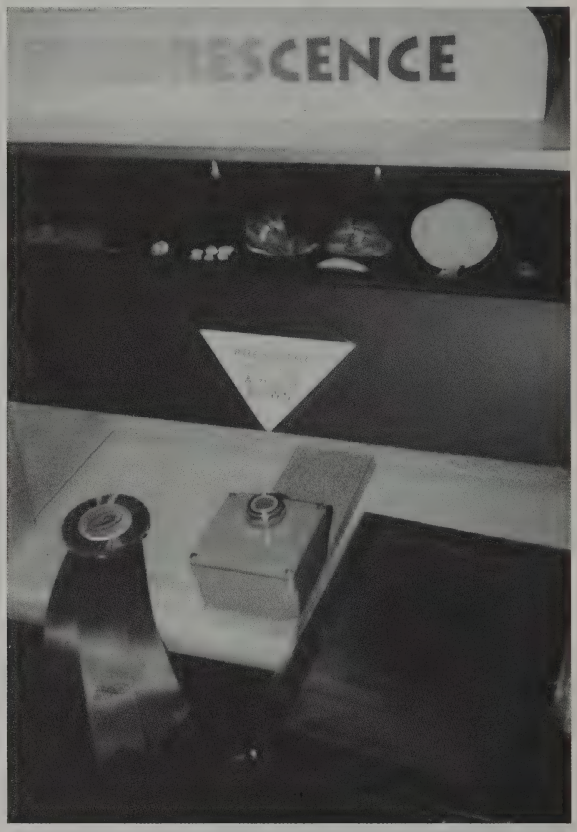
COA WINNERS PAGES

Edited by Charlotte Lloyd

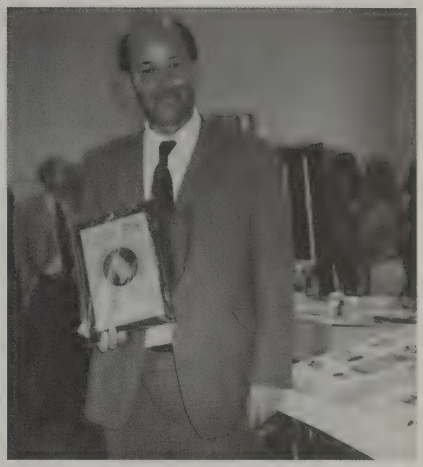
COA member Bob Pace won the COA Award at the Naples Shell Show on Feb. 14-17 of this year. Over 1800 visitors to the Show saw his impressive 43' exhibit of "Uncommon and Rare Florida-Caribbean Shells – Gastropoda Only." Congratulations to Bob on his winning exhibit.



At the Marco Island Shell Club Show on March 13-16, B. J. & Lowell Bingham exhibited "The Presence of Fluorescence." This most unusual scientific exhibit had an electrical demonstration that showed the presence of fluorescence in mollusk shells. Great Job, Binghams!

On Jan. 19-20, 2002 at the Space Coast Shell Festival, Alice Monroe won the COA with her educational display, "Shell Pigments." This 10' – 5 case exhibit showed many color-variations in mollusks. This popular show had over 2,000 visitors in attendance.

Gene Everson of Louisville, KY won the COA with his "Strombidae Worldwide" at the Seashell Searchers Shell Show Oct. 20-21 of 2001. His exhibit had photographs of live animals, habitat, life stages, illustrations and wonderful shells. Another exceptional job by this fine exhibitor.



The British Shell Collectors' Club Shell Show was held in later October of 2001. John Llewellyn-Jones, proudly pictured with his COA Award, won with his exhibit on the Mother of Pearl Industry and the shells used to produce buttons. Congratulations, John!

Diver-collector Jim VunKannon exhibited his beautiful shells in his 30' exhibit entitled "Shelling Turks & Caicos Islands" at the Broward Shell Show on Feb. 1-3 of this year. Judges H. Lee and C. Takahashi awarded Jim's effort with the COA.

Riding Shotgun on the Mollusk Coast *(Continued from page 7)*

At another section of the beach Beth and Ed snagged milk conchs, *Strombus costatus,* while both Ed and I found colorful single lion's paw *Nodipecten nodosus)* valves. Later I suggested to Ed that if our valves matched we could draw straws to see who would keep the pair. (They didn't).

All in all the beaches of El Cuyo had an incredible variety of fine shells, representative of Gulf of Mexico fauna. In addition to those already mentioned, there were *Cantharus tinctus, Busycon contrarium, Busycon spiratum plagosum, Phalium granulatum, Cymatium parthenopeum* and *Cymatium femorale.* Bivalve pairs abounded, such as *Macrocallista maculata* (the handsome checkerboard clam), *Arca zebra, Chione cancellata, Pteryia colymbus, Atrina rigida* (I'm one of those upstarts who likes pen shells), *Dinocardium robustum, Trachycardia muricatum,* and *Laevicardium laevigatum.* Peggy found an unusual *Rupellaria typica* on the jetty. This is a small white bivalve encased in a piece of porous rock. She passed this on to me along with a perfect little "cup and saucer" (*Crucibulum planum).* What more could one want?

My handful of snack baggies and pants pockets didn't begin to accommodate the sheer numbers of collectible shells here. Thus I propose another of my Laws of Shelling: The number of shells one finds, and their size, is inversely proportional to the number and adequacy of the collecting receptacles one has brought!

And, the fun wasn't over for this day. As we drove away, I noticed a muddy and mangrove studded inner shoreline. "I bet there are shells there," I hinted. Peggy, to my delight, agreed and stopped. Soon she had found a large pile of *Melongena bispinosa* – "trademark" shell for the Yucatan. We sorted through these, ignoring the pesky little insects inside the apertures.

Riding shotgun again as we drove on west towards Merida, I thought it fun to look back at the other shellers and chatter about what we had found, snack on the eternal cheese crackers and raisins, and practice Spanish pronunciation under Peggy's expert tutelage. In Merida, we all enjoyed the festive Christmas tree in our hotel lobby, although for the northerners, this reminder of the season made it startling to walk out into tropical weather.

Campeche

Next morning, after a scenic drive through Uman, a large town south of Merida (where we were enthralled by a stunning large Moorish building), we arrived at the outskirts of Campeche. Here was a "fragrant" smelling seaweed-and-rock-studded beach. Old boats were pulled up. We found piles of large shells that had been emptied for food and had the telltale spire hole cutting the animal loose from its shell. There were chanks (*Turbinella angulata)* and whelks (*Busycon perversum).*

I was holding out for some smaller shells, and after we turned off the roadway south of the city, I wasn't disappointed. Scrambling around and turning over rocks yielded a fresh *Marginella guttata, Nerita tessselata, Littorina nebulosa, Cerithium lutosum, Cerithium atratum, Modulus modulus,* and a variety of limpets. We explored a few other shoreline areas further south and then turned around to return to Merida. That night we had a special celebration – Peggy's birthday! Ed and Beth had arranged for a cake – shaped like a shell, of course.

Celestun

Following directions out of town given us by a charming woman dressed for church and being pulled in a cart by her husband, we headed the next morning to Celestun. There we were confronted with what now seemed to be the typical Yucatan coastline village – the skinny dogs, the narrow dirt streets, the little groceries and cafes with rusty signs outside; and coffee-skinned people in native dress. But that wasn't all. There was a pharmacy. Stepping inside, we were greeted by a cool wave of air conditioning. The shelves were lavishly and neatly stacked with boxes and bottles of the widest array of drugs that I have ever seen. A diminutive Mayan woman deftly rang up purchases on a little adding machine.

Celestun gulf shelling featured smaller species: there were *Olivella* and *Marginella* species in one of the drift lines. We also shelled a little protected cove where we found *Tellina lineata* and *Fasciolaria tulipa*, and Peggy came up with an interesting *Trigononostoma tenerum*.

For the afternoon we took a boat ride in the back waters to see the highly touted flamingos. We were not disappointed There were not only huge flocks of the spectacular pink birds that winter there but also a wide array of other water fowl.

By this time in the trip, the "tulip talk" that seems to be a focal point of shell trip conversation anywhere had begun. Whatever happened to the days when collectors rhapsodized about finding, say, a junonia, on shore? Gone forever, it seems, replaced by those who covet a *red* tulip. We had all found lovely tulips – orangey and brown. Would anyone get a red one? The suspense began to build.

Isla Holbox

The next day – out to Isla Holbox on the Northestern coast. It's not pronounced "I-la Whole-box" – It's "Eeslah-whole-bausch!" Donna shared an article on the island (http:/outdoorplace.org/shells/holbox.html) which further fueled our anticipation. At the shore, Peggy, in Spanish, arranged boat transportation in a jiffy and soon we were whizzing across the Gulf towards the island. "This is what it's all about," I mused to myself.

Our first stop was a large sandbar where we kept ourselves busy with *Tellina lineata* (a "signature" shell of Isla Holbox); *Cerithium algicola, Bulla striata, Olivella nivea* to name a few. Peggy found a pair of gorgeous deep orange *Lucina pectinata.*

Later, on another beach I dug at a little protuberance in the mud and lucky me – I now had a pair of these lucines. On this shoreline also were *Conus spurius,* and among the bivalves, marsh clams *(Polymesoda mexicana),* large cockles (*Dinocardium robustum), Macrocallista maculata, Chione cancellata,* and *Dosinia elegans.*

Our final collecting spot was in the village. Peggy had found a woman presiding over a little shop area in an alleyway. There were local shells everywhere in buckets, baskets and boxes! Peggy held out her hand. In it was just the shell to make my happiness complete: a gorgeous dark red tulip. "Collectively" we all came away happily with fine specimens of such species as C*onus spurius, Chicoreus florifer, Tonna maculata, Fasciolaria tulipa,* and *Cypraea cervus.* As the woman wrapped my purchases in old newspapers, she flashed me a silver-toothed smile and gestured to the *Cittarium pica* she was "throwing in" to seal the deal. Just another one of those warm moments that connect shell lovers and hosts across the continents.

That night we drove south through the resort hotel area of Cancun for

(Continued on page 23)

a totally American dinner at the Outback Steak House. Next morning, Peggy and I dropped the other shellers off at the airport. Donna was hand carrying home the largest *Pleuroploca gigantea*, from Holbox, she had ever seen.We were staying an extra day. First stop was an inland shoreline for "micros." I rushed onto the beach and...it was bare. Then, I spotted a breakwater up the beach. A careful sifting through little piles blown up against the rocks brought to light many tiny treasures: *Vexillum gemmatum, Crassispira cubanum, Anachis pulcherria* and other "dove" species, and even a few small emerald nerites, *Smaragdia viridis.*

That afternoon while Peggy, having driven us hundreds of miles in the preceding day, took some much deserved rest, I scouted the beach in front of our hotel. The first night, there had been nothing. However, about 100 yards down, I began to notice a gravel-like texture punctuating the smooth sand. Shells! There were *Conus floridanus* and if you'd believe, a *C. floridanus burryae.* Peggy had said there could be marginellas here and she was right. Marginella mecca! The distinctive Yucatan species *Prunum labiatum, Marginella beali, Marginella pruinosum*... as well as amazingly bright (for beach specimens) *Prunum carneum.*

Snorkeling and trying to keep a fin flapping out of the water at the same time as a signal to the jetskiis and other fast watercraft that were scudding around me, I retrieved more marginellas as well as several *Terebra protexta* and tiny white *Turbinella* species.

The Pittsburgh Connection

With "los caracoles" (Spanish for shells!) we had found carefully packed, next day we flew home. Subsequently I learned that Charles Sturm, a fellow Pittsburgher and Research Associate at Pittsburgh's Carnegie Museum, was offering a copy of a report of a three week's collecting trip to the Yucatan conducted by J.J. Parodiz, then Curator of Invertebrate Zoology at the Museum. I very fondly remembered "Jose" as advisor to the former Pittsburgh Shell Club. His text describes, among other things, how marginella species were found at Isla Mujeres, not far from the beach on which I found so many marginella species.

How do you sum up a trip in which so much fun, new learning, and adventure were packed into just a few days? We had covered much of the Yucatan coastline and sampled any number of different habitats. By my count we found nearly 100 different species. Perhaps beach shelling can come back into fashion!

Finally, the report of the Vokes expedition and the paper by J. J. Parodiz will be continued inspiration to collect and study the shells of this wonderful coastline – indeed, "The Mollusk Coast."

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News of New Species

For a number of years, Dr. Emilio Fabian Garcia has produced the News of New Species for COA's website, the Conchologist's Network, ConchNet (coa.acnatsci.org/conchnet/). He has combed journals from all over the world to assemble this news for you. He has recently retired from that effort to follow other pursuits. Our great thanks for a job so well done.

A fitting conclusion to those years of chasing down descriptions of new species, our own Emilio has published some more new species of his own. In a recent [September 2001 Vol 2 (3)] issue of the Belgian quarterly journal, *Novapex*, there appears "Three new deep-water epitonid (Mollusca: Gastropoda) species from the southern Philippines." *Cirsotrema ernestoilaoi, Cycloscala aldeynzeri and Epitonium (Parviscala) bevdeynzeri.* All three of the pretty, white little shells (an inch or under) are found in muddy sand off Aliguay Island in northern Mindanao. Two of the three are named for Bev and Al Deynzer, COA member-dealers, and the third is named for the Deynzers' Philippine partner, Ernesto Ilao. All were collected using banca boats and small, bamboo-framed trawls such as the one pictured in Phil Clover's article, "New Finds at Aligbay Island, Philippines" in September 2001 *American Conchologist.*

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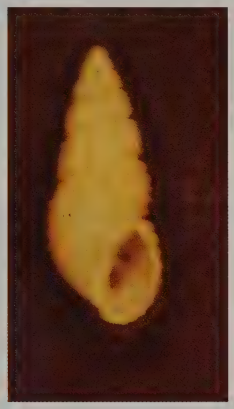
And Yet More Discoveries From a Collecting Expedition Off the Louisiana Coast

by Emilio Fabián García

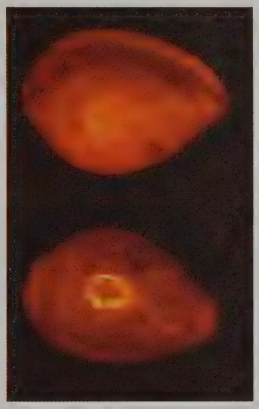
Due to some editorial difficulties with the March issue (Vol. 30, No. 1), a group of Emilio Garcia's photos were not published in his article, "More Discoveries from a Collecting Expedition off the Louisiana Coast." They are published here with our apologies to Emilio and to our readers for the inconvenience. —Ed.

Mathilda vanaartseni **de Jong & Coomans - 4.4 mm.**



Chrysallida nioba **(Dall & Bartsch) - 4.2 mm.**

Metaxia espinosai **Rolán & Fernández-Garcés - 6 mm.**



Granulina **sp. - 1.5 mm.**

Conus mindanus **f. agassizi (Dall)**

Triphora dupliniana **Olsson - 6 mm.**

Engina **sp. aff.** ***corinnae*** **Crovo - 6 mm (juvenile).**

News of the Malacological Society of Australia

Good news from Down Under for shellers: The Malacological Society of Australasia has teamed up with the prestigious CSIRO (Australia's Commonwealth Scientific and Industrial Research Organisation) to produce the fineAustralian journal, *Molluscan Research*. The journal will now appear three times a year instead of just once, with one of the three issues typically a monograph. It will also be accessible on the World Wide Web. And even more important, Dr. Winston Ponder, Principal Research Scientist at the Australian Museum, has accepted the editorship.

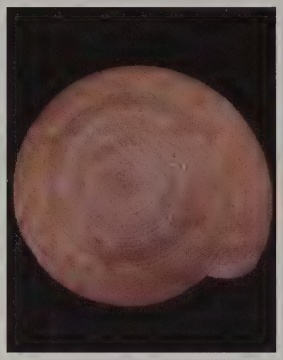
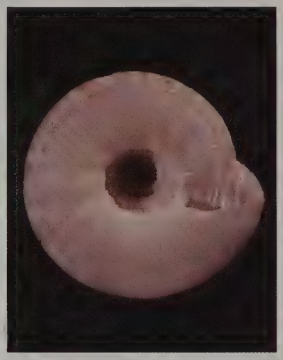
The Society hopes to increase circulation, and in so doing, to attract the contributions of more scientists. Their aim is to place *Mollucan Research* on a par with such journals as WSM's the *Veliger*, and the Field Museum of Natural History's *Malacologia*. Congratulations on this new partnership are in order. (*from Australasian Shell News No 112. Dec. 2001*)

Caribbean Architectonicidae

Architectonica nobilis Roding, 1798. 33 mm. 200', Commercial shrimper on continental shelf off Georgetown, Guyana

Architectonica sindermanni Merrill & Boss, 1984.18 mm. 900 m., off southeast Florida. (ex - Harvey Bullis Collection)

Architectonica peracuta Dall, 1889. 21 mm. 110 fathoms, off Key West, Florida.

Architectonica sunderlandi Petuch. 1987. (PARATYPE) 25 mm. Taken by Royal Red Shrimper from 180-200 fathoms, off south side of Key West, Florida

Heliacus perrieri (Rochebrune, 1881). 16 mm. Intertidal, off West End Hotel, Grand Bahama. (ex-Bob Quigley collection)

Heliacus cylindricus (Gmelin, 1791). 14.5 mm. Intertidal, off West End Hotel, Grand Bahama. (ex-Bob Quigley collection)

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Text and photos by Kevan & Linda Sunderland

The intent of this feature is not necessarily to distinguish valid or invalid species, but to provide illustrations of taxa not always popularly available, for the information of the collector.

Heliacus bisculatus (d'Orbigny, 1842). 7 mm. Dredged, 170', off St. Augustine, Florida

Heliacus worsfoldi Quinn, 1981. (PARATYPE) 7.5 mm. 30-40', off Settlement Point, Grand Bahama. (ex-Bob Quigley collection)

Psilaxis krebsii (Morch, 1875). 12 mm. La Chorrera (Sands), Cuba. (ex-John Finlay Collection)

Pseudomalaxis nobilis A.E. Verrill, 1885. 9 mm. Dredged,120 fathoms, nine miles E-SE of Carysfort Light, Florida Keys. (ex-Dieter Cosman collection)

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2002 Len Hill Award at Philadelphia

Each year, in fond memory of shell dealer and conchologist Leonard Hill, the Philadelphia Shell Club gives a special award to a lucky and talented exhibitor. This award is presented to the most aesthetically pleasing scientific exhibit at its annual show, held the first weekend in November.

But the remarkable aspect of this award is that each one is different, and each is a collector's item, a handmade, original work of art with a shell theme. The 2002 award is a stunning creation in glass by Ryan Higgins, a glass snail on a leaf. Ryan especially focuses his flame-worked glass on the beauties of nature, using a torch to melt a variety of glass rods and tubes, adding color using his own techniques to produce the exquisite creations he is known for. Will you be the lucky exhibitor who takes home this prize?

Where Are My Slippers?

by J. M. Inchaustegui

It was a warm summer day in the early 1970's and we had a three-day weekend ahead of us. My brother and two of his friends would ride in his boat and two of my friends and I would ride in mine. We were headed for the Mississippi Gulf coast from our homes in the New Orleans area to enter the Gulfport Fishing Rodeo. Five of us were excitedly hoping for a First Prize ribbon in our favorite fishing categories, and I was thinking of shells I might find on the way to the rodeo.

Banded *Crepidula*

Breton Island *Crepidula*

We would trailer our boats before sunup Friday and launch them at Delacroix, headed towards Breton Sound. Here we would find many islands and sand bars where we could catch cobia, drum, croakers, flounders, bluefish and many other types of fish, but for me the best part was that we were to spend the night on one of the Chandeleur Islands where I could walk the shallows in search of live shells in the turtle grass flats. After hours of fishing and riding around in the Sound, we selected a spot where we could anchor, unload our stuff, and sleep on the sandy beach with the ghost crabs. We spread out the plastic shower curtains we had brought for the purpose and lay down.

It was a balmy night with very little wind, but things changed rapidly. At about 2 a.m. a tropical squall came up and drenched us before we had a chance to get back in the boats and under the tarps. We spent a wet night crowded on the floor of the boats. Next morning, after a breakfast of soggy, cold-cut sandwiches, I walked around the island. I found some Lightning Whelks and Knobbed whelks, but some were very old and I n poor condition, while the majority were crabbed – *Pagurus pollicarus*, probably. I selected a couple of each species from among the good ones, and put the others back…except for one old crabbed shell that had slipper shells around the aperture and on the dorsum. I added this one to my shelling bag, slippers and all, to be cleaned and examined later.

This was the start of my interest in slipper shells, (*Crepidula*). All my shell books called the shells on the old whelk *Crepidula plana* Say, 1822, and this is the way I labeled them. Later I was to find them inside floating aluminum beverage cans, inside of glass bottles, on fishnet Styrofoam float balls, and on many crabbed shells. I found them from Grand Isle, LA, down through the Gulf coast to Marathon Key, FL. All my books said they were one and the same, and described them as WHITE. I found some in 1972 in Gulfport, MS which had a little color on them, but I did not, at the time, pay

(Continued on page 31)

Plate 1 (on page 29). 1a-e. *Agaronia travassosi* Morretes, 1938, off Cabo de São Tomé, Rio de Janeiro, Brazil, 50mm. 2. *Ancilla* cf. *dimidiata* (Sowerby, 1850), off southern Rio de Janeiro, Brazil, 17mm. 3a. *Ancilla dimidiata* (Sowerby, 1850), off Santos, São Paulo State, Brazil, 11mm. 3b. *Ancilla dimidiata* (Sowerby, 1850), off Cabo de São Tomé, Rio de Janeiro, Brazil, 30mm. 4a *Ancilla dimidiata* (Sowerby, 1850), off Cabo de São Tomé, Rio de Janeiro, Brazil, 30mm. 5. *Ancilla lienardi* (Bernardi, 1821), off Soã Luiz, Maranhão State, Brazil, 25mm. 6. *Ancilla matthewsi* Burch & Burch, 1967, Mucuripe, Fortaleza, Ceara, Brazil, 17mm. 7. *Jaspidella jaspidea* (Gmelin, 1791), Fernando de Noronha Island, Brazil, 15mm. 8. *Oliva* cf. *circincta* Marrat, 1881, off north Natal, Rio Grande do Norte State, Brazil, 30mm. 9a-b. *Oliva circincta* Marrat, 1881, Barra, Salvador, Bahia, Brazil, 50mm. 10a-b. *Oliva circincta tostesi* Petuch, 1979, Praia das Cabras, Ilhabela, São Paulo State, Brazil, 36mm. 11. *Oliva scripta* Lamarck, 1810, off Salinopolis, Pará, Brazil, 32mm. 12. *Olivancillaria auricularia* (Lamarck, 1818), Cassino, Rio Grande, Rio Grande do Sul, Brazil, 57mm. 13. *Olivancillaria brasiliana* (Lamarck, 1810), off Itajai, Santa Catarina State, Brazil, 52mm. 14. *Olivancillaria carcellesi* Klappenbach, 1965, off Vitoria, Espirito Santo State, Brazil, 31mm. 15. *Olivancillaria contorduplicata* (Reeve, 1850), North Laguna, Santa Catarina State, Brazil, 28mm. 16. *Olivancillaria deshayesiana* (Duclos, 1857), Cassino, Rio Grande do Sul State, Brazil, 25mm.

Brazilian Olividae

Caption for this plate is at the bottom of page 28. The article is on page 30. Plate 2 is on the back cover.

Brazilian Olividae

by José Coltro Jr.
Photos by Marcus Coltro
Photo editing by Tom Eichhorst

The color plates that accompany this article are located on page 29 and back cover.

I was five years old when I found a nice shell on the beach during my vacation in Santos, just 50 miles from São Paulo. It was my first self-collected shell – an *Olivancillaria vesica* (Gmelin, 1791). Finding that shell with its large white animal was a fantastic experience for me! I asked to my father to clean my prize and I have always kept this very special shell. Afterwards, I began to collect other shells, but the *Olivancillaria* continued to fascinate me.

The Brazilian coast boasts about 33 described Olividae and some other poorly studied species. Many of them are endemic; some belong to the Caribbean fauna and others to the Patagonian fauna. The main genera are: *Oliva* (2 species and 1 subspecies), *Olivancillaria* (9 species), *Ancilla* (5 species), *Agaronia* (1 species), *Jaspidella* (1 species), and *Olivella* (15 very confused species!). Most of the species occur in the intertidal zone, especially the *Olivancillaria* and *Olivella* groups, and the shells are normally found in clusters.

Oliva

The two *Oliva* occur in tropical areas. *Oliva scripta* Lamarck, 1810, previously known as *O. caribaeensis* Dall & Simpson, 1901, is found only in the north of Brasil, from Ceará to Amapá States. In some small villages in Pará State, fishermen consider this species a good luck and love charm! The other *Oliva* species is *O. circinata* Marrat, 1870. Recently Bernard Tursch and Dietmar Greifeneder, in their *Oliva Shells, The genus Oliva and the Species problem*, considered this species just a form of *O. fulgorator* (Röding, 1798), but no anatomical studies were done; consequently, I still consider *O. circinata* a valid species. Dr. Petuch (1987) described a subspecies for southern Brasil: *O. circinata tostesi*, a very heavy, low-spired shell.

Olivancillaria

The *Olivancillaria* are found from middle Argentina to Southeast Brasil – as far north as Vitória, Espirito Santo State. Of the nine species known, there are two that are endemic: my first shell, *Olivancillaria vesica*, and *Olivancillaria steeriae* (Reeve, 1850), a mysterious and very poorly studied species. The other species are found in almost all southern Brazilian states. They are: *O. auricularia* (Lamarck, 1810); *O. carcellesi* Klappenbach, 1965; *O. conturduplicata* (Reeve, 1850); *O. deshayesiana* (Duclos, 1857); the rare *O. teaguei* Klappenbach, 1964; *O. uretai* Klappenbach, 1965; and the fantastic *O. urceus* (Röding, 1798). *O. urceus* has a variant population that may deserve a specific study – *Olivancillaria brasiliana* (Lamarck, 1810), considered by E. C. Rios (1970, 1975, 1984, 1994) as synonym, but again no anatomic studies were made.

Ancilla

The *Ancilla* group occurs along the entire Brazilian coast. One species is found in southeast and southern Brasil and the other four occur in the northeast and north ranges.

The species found in southern Brasil are two: *Ancilla dimidiata* (Sowerby, 1850) and a probable new one. *A. dimidiata* was described as a fragile, transparent, white shell, but a population of different shells, large and orange in color, is found between Rio de Janeiro and Espirito Santo State. The species are easily distinguished from each other.

The north range has some of the most beautiful Brazilian Olividae: *A. faustoi* Matthews & Matthews, 1978, with orange, white, or yellow populations; *A. lienardi* (Bernardi, 1821), a solid and very bright orange shell; sometimes albino specimens are found; *A. matthewsi* Burch & Burch, 1967, more solid than *A. faustoi*, with color variation; and *A. tankervillei* (Swainson, 1825), a dubious species on the Brazilian coast – probably found only offshore from Amapá State.

Agaronia and Jaspidella

Agaronia travassosi Morretes, 1938 and *Jaspidella jaspidea* (Gmelin, 1791) are the sole members of their genera. *A. travassosi* is an endemic species, very elegant and colorful. It is found from Espirito Santo State to Santa Catarina State. Recently we got some great orange and salmon color specimens from the Rio de Janeiro area.

The *Jaspidella* olive is found most commonly on Fernando de Noronha Island and Rocas Atoll. Very few Brazilian specimens are in collections.

Olivella

The genus *Olivella* is well represented along the entire Brazilian coast. And it is a huge mess! Rios listed 15 species, but probably some of them are not well identified and others are undescribed. The well-known species are *Olivella defiorei* Klappenbach, 1984, a very elegant and ornamented shell; *O. plata* (Ihering, 1909); *O. puelcha* (Duclos, 1840); *O. orejasmirandai* Klappenbach, 1986; *O. formicacorsii* Klappenbach, 1962; *O. olssoni* Altena, 1971; *O. tehuelcha* (Duclos, 1840); *O. nivea* (Gmelin, 1791): and *O. riosi* Klappenbach, 1991. Some other species need revision: *O. ephamilla* and *O. amblia* Watson, 1882 are two very similar deep water species ; *O. floralia* (Duclos, 1853) is frequently confused with *O. defiorei*; *O. petiolita* (Duclos, 1835), *O. mutica* (Say, 1822); *O. watermani* McGinty, 1940 and *O. minuta* (Link, 1807) are dubious Caribbean species of the Brazilian coast.

Olivella nivea has two different population: the one in north and northeast Brasil is very close to the Caribbean population, but the specimens found from Rio de Janeiro to Bahia are quite distinct: the shell is bigger, heavier and more colorful. Some other Olivella are found along the coast and probably the large majority are new species.

Like other families, the Brazilian Olividae needs to be studied better. I believe that many new species will be found!

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Some Useful Literature on Olividae:

Petuch, E.J. 1987. *New Caribbean Molluscan Faunas.* Coastal Education and Research Foundation, Charlottesville, VA

E. C. Rios, E. C. 1994. *Seashells of Brazil.*

Tursch, B. and D. Greifeneder, 2001. *Oliva Shells, The genus Oliva and the Species problem.* L'Informatore Piceno, Italy and Bosque BMT, S.A., Costa Rica.

Where Are My Slippers? *(Continued from page 28)*

any attention to the color, and labeled them *C. plana*.

Well, how wrong could I be? I recently found a crabbed *Polinices duplicatus* in the Mississippi Sound in Long Beach, MS. When I picked it up I noticed that there were two small slipper shells on the inside of the lip, and since this Moon Snail was in good condition, I took it home. Then for the first time, I noticed that the color did not really match the majority of my crepidulas, so I sent them to my friend, Dr. Emilio Garcia in Lafayette, LA. He at first confirmed that this was some undescribed color form of *C. plana*. Next, he threw a bombshell at me, telling me that they are not *C. plana* at all, that Ms. Rachel Collin at the University of Chicago has discovered with the help of DNA studies that another shell named by Say in the same year, has precedence. I quote from his letter:

"Rachel Collin from the Field Museum of Natural History just published a very thorough study of the *Crepidula plana* species complex occurring from western Texas to New England (Collin, R. 2000. Phylogeny of the *Crepidula plana* (Gastropoda: Calyptraeidae) cryptic species complex in North America. Canadian Journal of Zoology 78:1500-1514) Using several independent techniques including DNA sequencing, scanning electron microscopy of shell and soft parts, and observation of early development stages, she has shown that there are three shallow-water cryptic (very similar, particularly in shell morphology) species. *Crepidula plana* Say, 1822, ranges from (AT least) New England to Georgia. *Crepidula depressa* Say, 1822, ranges from Lake Worth, FL., (possibly a little further north of this) to Port Aransas, TX (possibly westward into Mexico). And then there is the newly described *C. atrasolea* Collin, 2000, occurring from Core Sound, NC to Sanibel, FL (the type locality for *C. atrasolea* is Wulfert Point, on the northern, bay side of the island). Although it should still be difficult to ID shells only (minus soft parts), the job is now made much easier in the presence of soft parts. *Crepidula atrasolea* has darker foot and mantle pigmentation. The other two species have lighter colored soft parts, and their ranges are apparently mutually exclusive. Other differences are in radular morphology, type of development, protoconch, reproductive anatomy, and DNA structure."

So the shells I have collected are a color form of *Crepidula depressa* Say, 1822, and I propose to name this color form *Crepidula depressa* mississippiensis Inchaustegui, 2002. Although I have collected, in thirty or so years, over 180 totally white *Crepidula depressa*, I have been able to collect only six with some color, mainly on the edges, and just three with rose/mauve rays from the apex to the outer lip area in a fan shape. The three rayed shells were collected in the Long Beach area, in the Mississippi Sound, in very shallow water. The ones with only a little color were collected in the same locale, but about five to six miles east at Gulfport, MS. I have not collected any, with even a little color, east or west of Mississippi.

So, although my brother came away with two ribbons from the Gulfport Fishing Rodeo, I feel that I got the better deal by finding something that was not found again until many years later.

I would like to express my appreciation for assistance to Dr. Emilio Garcia, Dr. Emily Vokes, Ms. Rachel Collin, and to Jim Miller of Tallahassee, FL for photographing these shells.

464 W. Beach Blvd., Long Beach MI 39560-5967

AMS to Meet in August

The 68th annual meeting of the American Malacological Society will meet in Charleston, South Carolina August 3 - 7, 2002 at the College of Charleston's Lightsey Conference Center. What a lovely and historic venue! If you haven't already made plans to attend, there's still time!

What's going on? The annual auction of books, papers, shell art, and shelly stuff in general (no shells though!) will be held on Monday, with Dick Petit holding the auctioneer's gavel. Don't miss it!

In addition to the general sessions for contributed papers on a variety of topics, there will be a featured symposium, "The Biology and Conservation of Freshwater Gastropods," organized by Rob Dillon; a satellite session entitled "Pulmonate gastropods in the laboratory," organized by Amy Wethington; and a special session: "Multidisciplinary Approaches to Molluscan Phylogeny," put together by John Wise and Ellen Strong.

The conference hotel is the Weston Francis Marion at 387 King Street, Charleston SC 29403. Many restaurants are within walking distance or meal tickets may be purchased from the College of Charleston student cafeteria, about a block and a half from the hotel.

Field trips on August 7 sound exciting. Ranging in price from $35 to $50 per person, they take full advantage of Charleston's natural and historical treasures. The "Bull Island Adventure" is a 40 minute ferry ride through rich salt marsh creeks that will take you to "a subtropical forest of magnolia, palmetto, bay and live oak, draped in Spanish moss." Over 300 species of birds call Bull Island home. Lots of alligators and the recently introduced red wolf will provide even more natural excitement. Bull Island's "Boneyard Beach" has been described as the most fabulous stretch of beach on the east coast.

"Inshore Trawling" on a Marine Resources Division research vessel is choice #2. Half a day of benthic trawling over several diverse bottom types and habitats at the Fort Johnson Laboratory should appeal to almost anyone who loves mollusks.

"Fun and Freshwater at Charles Towne Landing" consists of a fascinating visit to the state park at the site of the 1670 English settlement of South Carolina. You'll see recreations of the original fortified Charles Towne and of the sailing ship, Adventure, and there's a natural-habitat zoo of original wildlife. Miles of foot and bicycle paths complete the list of attractions...and don't miss the ponds, home to freshwater mollusks.

The "Ashley River Plantation Tour" takes you to two contrasting plantations. To quote the registration form information sheet: "Begun in 1738, Drayton Hall is the oldest surviving Georgian-Palladian dwelling in the American South." Middleton Place, dating from 1741, "contains America's oldest landscaped garden; the butterfly lakes and sculpted terraces were designed by Henry Middleton, President of the First Continental Congress....The main body of the house was burned in the Recent Unpleasantness, but family furniture, paintings, silver, and documents are displayed in the wing that remains."

For more information, or to download a registration form, see the website AMS President Rob Dillon has put together at http://www.cofc.edu/~dillonr/AMS2002.htm or contact Dr. Dillon at the Department of Biology, College of Charleston, Charleston, SC 29424 Voice: 843-953-8087 Fax: 843-953-5453 Email: DillonR@cofc.edu

Brazilian Olividae

Plate 2 from Coltro article on pgs. 29 and 30. 17a-d. *Olivancillaria steeriae* (Reeve, 1850), off Cabo de São Tomé, Rio de Janeiro State, Brazil, 28mm. 18a-b. *Olivancillaria urceus* Röding, 1798), off Caraguatatuba, São Paulo State, Brazil, 43mm. 19. *Olivancillaria uretai* Klappenbach, 1964, Praia do Cassino, Rio Grande do Sul State, Brazil, 27mm. 20a-b. *Olivancillaria vesica vesica* (Gmelin, 1791), Arraial do Cabo, Rio de Janeiro State, Brazil, 44mm. 21. *Olivella defiorei* Klappenbach, 1964, Guarapari, Espirito Santo State, Brazil, 10mm. 22a-f. *Olivella nivea* (Gmelin, 1791), Arraial dos Buzios, Rio de Janeiro State, Brazil, 16mm. 23. *Olivella orejasmirandai* Klappenbach, 1986, off Santos, São Paulo State, Brazil 6mm. 24. *Olivella riosi* Klappenbach, 1991, off Santos, São Paulo State, Brazil 5mm. 25. *Olivella tehuelcha* (Duclos, 1840), off Santos, São Paulo State, Brazil 6mm. 26. *Olivella verreauxii* (Duclos, 1857), São Sebastião, São Paulo State, Brazil 7mm. 27. *Olivella watermani* Macginty, 1940, 70km off Alcobaca, southern Bahia State, Brazil, 9mm.

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American Conchologist

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Quarterly journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

Vol. 30, No. 3 **SEPTEMBER 2002**

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors – to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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MEMBERSHIPS are for the calendar year, January-December, late memberships are retroactive to January. 2002 DUES: (USA) $20; postal surcharge: $5 for Canada and Mexico; $10 for other Western Hemisphere nations; $12 for Europe; $15 for Asia, Africa, and the Pacific Rim. Please pay in U.S. dollars ($), or with a check on a U.S. bank with Transit Enrouting and Account Numbers printed at the bottom, or with money order. Make checks payable to: CONCHOLOGISTS OF AMERICA.

President's Message

It's amazing how quickly time has gone by since we all got together in Sarasota, Florida this past July. Peggy Williams and her colleagues did a wonderful job welcoming COA to their fair city and providing us with "the greatest show on earth". As time moves forward I hope many of you are making plans for our 2003 convention. Tom Rice and his group have been hard at work getting ready for us to enjoy the wonderful Puget Sound region of Washington. Is it in metaphoric reference to the region's favorite weather or to the regal nature of our common interest that brings out the convention theme of "Reigning Shells"? Come and find out. Plans are already well underway for having the 2004 convention in the Clearwater region of Florida. Betty Lipe, our past President, just can't rest. She and her group are moving forward with the preparation of that convention and will have more to say about it a little later.

We have seen a number of changes this year in our organization. Perhaps one of the biggest has been Lynn Scheu's decision to retire as the Editor of American Conchologist. Lynn has performed this duty for 16 years and I believe it goes without saying that we all have benefited greatly from her time in that position. The baton has now been passed to Tom Eichhorst. We've seen the articles that Tom has contributed to American Conchologist over the years and the demonstration of his past works leaves no doubt that he will do a great job as our new Editor.

One of the largest funding sources of the COA are the proceeds raised from the silent and main auctions held each year at the convention. I urge our members and friends to continue to support the COA auctions with your donations. To better help the convention organizers, this year Jim and Linda Brunner will collect all donations and organize them for the 2003 convention. For more information regarding this process please contact the Brunners at **jili@earthlink.com.**

Summer is coming to a close, my family and I survived the move from New Jersey to Kansas, Todd (our 6 year old) is experiencing the dual trauma of starting first grade and losing his first tooth and we're off and running towards the next issue of American Conchologist and the 2003 convention. It seems like Sarasota happened only yesterday! Thanks everyone for your help and continued support.

Tom Grace

NEW MEMBERS apply to Doris Underwood, MEMBERSHIP DIRECTOR; **RENEWALS** go to Steven Coker, TREASURER. **BACK ISSUES** are available from Hank Foglino, PROPERTIES DIRECTOR. Prices: prior to 1985, $3 each; 1985 to current, $5 each.

FRONT COVER: Four color varieties of *Fasciolaria tulipa hollisteri* Weisbord, 1962 found in shell dumps at La Restinga by Phil Fallon on his Margarita trip (see Phil's article on page 6). The patterned specimen is probably from Isla Coche. Photograph by Phil Fallon.

BACK COVER: Colored pencil drawing of *Lambis chiragra* (Linnaeus, 1758) by Michael Sanchez of Albuquerque, New Mexico. Mike works at the New Mexico Museum of Natural History and is a member of the High Desert Shell Club.

Helen DuShane (January 25, 1907 — May 18, 2002)
Retired Educator; Amateur Malacologist; Bachelor of Science -1931; Master of Science -1936; Instructor - Department of Education Univ. of S.C. 1929-1937; Teacher - Los Angeles City Schools 1937-1975; Research Associate Invertebrate Zoology L.A.C.M.N.H. 1967.

PUBLICATIONS:

A New Genus and Two New Species of Typhinae from the Panamic Province, 1969
The Baja California Travels of Charles Russell Orcutt-Baja Travel Series, 1971
Panamic Province Marine Mollusks, in Di Peso- 1974 Casas Grandes, Vol. 6 in Paleontology
17 other papers on mollusca in various publications.

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Marine Mollusks of the Panamic Region (Especially Epitoniidae)

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(From "AMERICAN CONCHOLOGIST-1975 Tucker Abbott)

Having only known Helen for the last nine years of her life was a bit of a disappointment, as I would have liked to have known her during her years of active research. However, it was a great pleasure spending time with her and her daughter in their home in southern California. As we lived close to Helen and Renee at that time, it was a simple thing to pick up the phone and ask Helen if she'd like a few cookies or nice French cakes from our local French bakery. You could always get a "yes" if cakes were involved. Helen had a real sweet tooth. When we first met Helen, in 1993, she was still very healthy and she could get around her home to the "office", where she kept her famous Epitoniidae collection. By then she had already donated her Panamic Collection to the American Museum of Natural History, but was reluctant to give away "her babies", which she protected as she would a child.

My wife Hiromi had a small collection of Epitonids and Helen was always ready to help identify and synonymize new specimens. They were immediately like two friends who had known each other for years. After collecting fossil Epitonids in San Diego, we brought several to Helen and she said that she didn't have specimens of that particular species but that the American Museum had made her a cast of some that were in their collection. "I really don't need more specimens", she said, but a few days later she called and asked if we still had some specimens that she could put in her "special drawers".

As time went by, Helen's health got poorer and before we left Whittier for Eureka, she was in a wheel chair. It was a most interesting sight to see Renee (also in a wheel chair) pushing Helen around the house, as they both said, "It was like a train". There was always a lot of humor in that household.

In the past 5 years, we saw Helen 5 or 6 times, each time we made the 750 mile trek to Southern California. These trips were a pleasure for all of us, as we ate our cookies and French pastries. Two years before she passed away, Helen donated her famous Epitoniidae collection to the Santa Barbara Museum of Natural History, and to Hiromi and me, her "special drawers" and her shell cleaning tool box (made by Roy Poorman) both of which she signed, as if they were paintings.

Although we only knew Helen for the last nine years of her life, it brought us great pleasure to be in her company and to share her love for shells.

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INDONESIA:
A MALACOLOGIST'S PARADISE

by
Zvi Orlin (e-mail: zviorlin@actcom.co.il)
(Also published in a slightly different version in *Triton*, No. 1, March 2000)

Indonesia is a most attractive destination for the potential tourist. With 6,000 inhabited islands stretching across almost 5,000km, from the Malay Peninsula to the borders of Australia, it is endowed with a fascinating array of flora and fauna. This is a meeting place of four major religions (of which Islam dominates on most islands) and because it is situated on the "ring of fire" (a meeting of tectonic plates), volcanism is evident everywhere. Add to this a kaleidoscope of cultures and outstanding scenery and you have an attraction hard to resist. For us malacologists, the location could not be better as the area borders both the Indian and the Pacific Oceans. I will not burden you with all of the beautiful sights, handicrafts, works of art, and exotic dance performances I saw, but will instead concentrate on the molluscan fauna.

Procession at Hindu temple on Bali.

Traditional boat-shaped houses Palawa, Sulawesi.

In preparation for my trip, the only extensive book on the area I could procure was *Indonesian Shells* by Bunjamin Dharma (two volumes). These books have color illustrations of over 1,000 species with Latin names and a brief description of each in English (size, frequency, habitat), but most of the text is in the Bahasa Indonesian language. I visited three of the main islands; Java, Bali, and Sulawesi and traveled extensively for two and a half weeks. In that time I searched 23 beach locations and collected over 1,300 specimens of marine shells, which I have just begun to classify. So far I have found 370 species with confirmed identities. Dharma's books proved inadequate but fortunately, my four volumes on Australian Marine Shells (gastropods and bivalves) have been of great help. About 65% of the species are gastropods and 35% bivalves. Interestingly, 35% of the species so far identified are also found in the Red Sea.

Some details of my finds follow: Gastropods – the families with the most species were Cypraeidae with 27, Conidae 24, Muricidae 21, Neritidae 18, Strombidae 14, Olividae species and forms 12, Trochidae 10, Naticidae 8, Cerithiidae 8, Buccinidae 7, and Nassariidae 6. Bivalves were: Veneridae 22, Arcidae 10, Mytilidae 9, Mactridae 8, Cardiidae 6, and Lucinidae 6. All of the species of Chamidae 5 and Ostreidae 4 are also found in the Red Sea.

The most prolific locations were the northern beaches of Bali, southwestern beaches of Sulawesi, and southern Java. On one of the beaches of north Bali I found a pile of discarded bivalves left by the fishermen – mainly Ostreidae and Chamidae and some Tridacnidae. As the lower valves of most were attached to rocks, they were too heavy to bring back. But I did manage to separate

one *Chama plinthota* from its rock and also brought back some fine specimens of *Tridacna crocea*. Two other interesting bivalve finds were *Hecuba scortum* and *Harvella plicatoria*, both firsts for me. At Sulawesi I also found a few *Hippopus hippopus*, some of which were probably brought onshore by local fishermen. Of the ten species of olives I collected, specimens of each were found at Sulawesi – 40% of the 26 species listed by Dharma.

Springsteen and Leobrera, in their book *Shells of the Philippines*, regard the Philippines as "an insulated biota, with an unusually high concentration and diversity of species, with around 5,000 valid species..." This number has surely gone up in the last 15 years. Sulawesi may well be an extension of this phenomenon, as it is adjacent to the southern Philippine Islands. I was most impressed with the diversity and uniqueness of the species I found there.

(Above) Prambanan Hindu temple in central Java. (Below) Barong dance performance at Butulan, Bali.

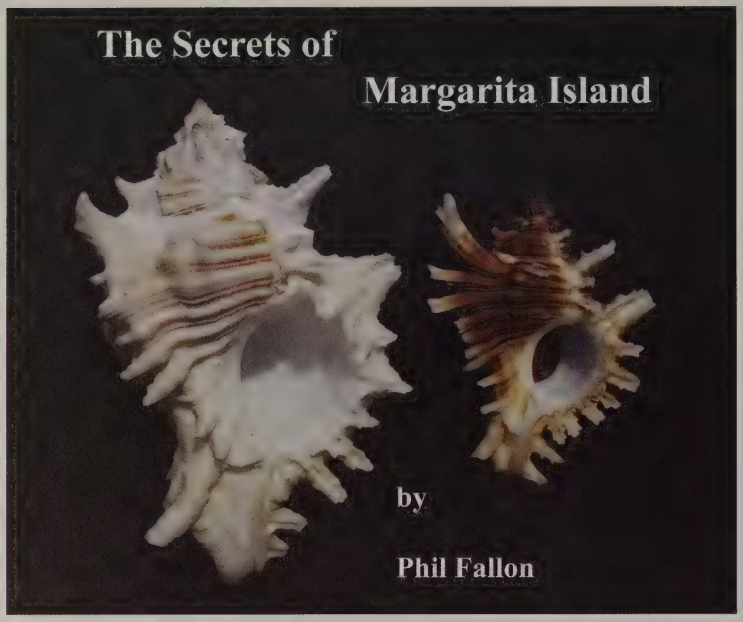
In northern Java was a distinctive location. It was low tide and on the shores of a muddy lagoon open to the sea, I found many specimens of *Babylonia spirata*, *Pugilina cochlidium*, *Hemifusus ternatanus*, and *Natica tigrina* – all of which prefer brackish or muddy waters. This was the only location where I found these species.

On my way to one of the beaches on southwest Bali I noticed many terrestrial shells lying on the ground between trees on a hill. I collected many specimens of four species, the most interesting of which was *Achatina fulica*. One specimen I collected is over 10cm long. This species belongs to the family Achitidae or giant African snails, the largest known land gastropod which can grow up to 20cm. They are from East Africa and have been introduced by man into India and throughout the Pacific, including Hawaii. On one of the Sulawesi beaches I found an additional land snail, a specimen of *Amphidromus inversus*, a sinistral species. This species is in the family Camaenidae; tree dwelling vegetarians of which many colorful species are found in Indonesia. It was found with marine shells and must have been washed out to sea.

Finally, in my opinion, any reference to Indonesia is not complete without mentioning the most distinguished naturalist of the 19th century – Alfred Russell Wallace. A contemporary of Darwin, Wallace spent five years collecting fauna in the Amazon and then a further eight years (1854 – 1862) collecting in Indonesia. He collected some 125,000 specimens of which there were 7,500 specimens of shells – many new to science. He was a phenomenal collector with over 1,500 new species to his credit. All, who like myself, enjoy traveling in remote regions, cannot but admire a man who collected in such dangerous and isolated locations. He was confronted by tropical diseases and earthquakes, and in primitive conditions had the draconian task of collecting, preparing, packing, and shipping viable specimens from small ports in Indonesia to England. He surmounted unbelievable difficulties unknown in our century. He also faced the monumental task of classifying this collection in a time when there was very little in the way of reference material. He even built his own boats to venture between islands when no other transportation was available.

One of Wallace's well-known contributions was recognizing a transition zone between the flora and fauna of S.E. Asia and the Australian region. He demarcated a line, called the Wallace Line, that passes between the islands of Bali and Lombok, and further north between Sulawesi and Borneo (or Kalimantan as it is called in Indonesia). Mollusks were among the fauna used to determine this line. However, recent research has established that the border-line of Australian species should be further east of Sulawesi, which has a high percentage of endemic species and as well as a conglomeration from both regions.

...Continued on page 15



We've all heard that Margarita Island is a great place to shell... well, if you like to comb beaches and snorkel, and especially if you don't mind sorting through mountains of shell dumps, this is a wonderful place to acquire shells of the southern Caribbean. I'll describe the great shelling places on Margarita and the species that our group (20+) encountered during the latter part of March, beginning of April 2002.

Margarita Island is the largest of the islands that lie about 30 km off the northern coast of Venezuela. It is comprised of two parts, each of which has more or less central mountains separated by a long, low-lying narrow land bridge. The bridge includes a large lagoon, Laguna de Restinga, opening to the sea on the south side. On the smaller, western portion (called Macanao), villages are principally located around the island's perimeter. On the main island, the villages are mostly west and south of the mountains, which drop gradually into the sea where there are small isolated sandy beaches and villages nestled in hilly folds. The northern and eastern side of the main island is where most of the tourists go—for sun bathing, swimming and other vacation pursuits—which we avoided. As you know, we shellers prefer the rugged life—climbing over barnacle-encrusted or slippery rocks, enduring the ferocious bites of no-see-ums, and the character building exercise of repeatedly squatting and kneeling on hot sand.

Beyond the more modernized urban areas, the local people live principally by fishing and have simple housing constructed loosely of scrap wood, stucco and sheet metal. Their dependence on anything from the sea, a sea full of mollusks, is of course a great boon to the shell collector because their garbage made our collecting so much more rewarding. Furthermore, the weather is ideal since it rarely rains, an obvious fact, as the island is mostly a desert filled with all sorts of cacti and other xerophytes. Suntan lotion with a high SPF was a must on this tropical desert island, right up there with bottled water.

Our group spent 10 days on a whirlwind adventure around the island and to the nearby smaller islands under the guidance of Glenn Duffy, whose ease with Spanish and carefully laid out itinerary made our trip go flawlessly. The various areas visited (15 in all) represented a variety of habitats and shelling opportunities that yielded approximately 213 species of shells. Not every species taken was recorded before it disappeared into the bag of its happy finder. You will also find that the chitons (very common) and some other rocky intertidal species have been neglected for the most part because of the prejudice of this writer. Neither does the list include the microshells that are sure to be abundant, nudibranchs and cephalopods.

I will describe our adventure by traveling counterclockwise around the island, starting at the beach west of Juan Griego located on the northwestern side of the main island. This long exposed shoreline has a narrow sometimes sandy, sometimes rocky beach with piles of shells that have been washed in by wave action and the predominant easterly wind. The greatest diversity of mollusks can be found here. By far the most common shell was the bivalve *Arca zebra*, accumulated in piles above the high tide line. Here species of the southern Caribbean include the columbellids *Stombina pumilo*, *Anachis lyrata*, *Persicula interruptilineata*, and *Prunum prunum*. Beautiful specimens of the large turrid, *Clathrodrillia gibbosa*, were found in the beach drift by both Bob Iwamasa and Bill Kreis. On calm days this beach could be snorkeled, as there are rock ledges that extend from the intertidal area and off into the subtidal.

The next stop is just a few miles to the east, Punta Tacuantar, which has a narrow sandy shoreline with similar rafts of *Arca zebra* shells above the high tide line, and near shore in shallow water, rocks that can be turned. A few simple fishermen's homes sit perched on a bank just beyond the high tide line. Discarded shells deposited right at the waterfront were also found here. A number of *Eburna tankervilli* and a few large *Semicassis granulatum* were found in the shell piles, as were fresh, complete (articulated) specimens of a clam, *Mactrotoma fragilis*, and on the rocks in shallow water, *Tegula excavata*, *Tegula vidula*, *Lithopoma*

***Conus mappa trinitarius* Hwass, 1792 (considered by some to be a synonym of *Conus aurantius* Hwass, 1792.**

***Cymatium nicobaricum* from Los Frailes (87 mm) and typical specimen from the Bahamas.**

tuber, *Planaxis nucleus*, *Leucozonia nassa* and *Siphonaria pectinata* were all common.

A little further on south of Punta Tacuantar, a few of us snorkeled and one of us (Dick Bingham) brought up a prize live *Calliostoma purpureum*. The water was a little rough this day and the poor visibility restricted our finds. The beach, which was fairly small, had fine dark gray sand and on the receding tide very small species were easily seen and collected if you fancy knee and elbow shelling. Trevor Roberts and I found lots of *Olivella minuta*, *Parvanachis obesa*, and a few small epitonids.

Traveling east of Punta Tacuantar, on the north shore of the bridge between the island's landmasses, is a long, broad, exposed sandy beach with a strong surf. The group stopped at a resort area comprised of a cluster of food stands and sheltered picnic tables inside Parque Nacional Laguna de la Restinga, or just La Restinga. This high-energy beach is home to millions of *Tivela mactroides*, and to other, less common bivalves: *Pitar dione, Anadara brasiliensis,* and large beautiful watermelon red *Tellina punicea.* Collecting here was difficult because one had to choose from so many

Color variation in *Phyllonotus margaritensis* Abbott, 1958 from La Isleta shell piles.

beautiful specimens. Over on the western end of this very long beach, piles of *T. mactroides* shells dumped by fishermen yielded other surprises: *Natica cayennensis*, *Bufonaria bufo*, and others. Another shell dump was located behind the cluster of food stands and among mangroves that border the northern reach of Laguna de Restinga, a tremendous bay system stretching south of the land bridge. This is the habitat of another treasure of Margarita, the red tulip. This dump had hundreds of red tulip, *Fasciolaria tulipa hollisteri*, a variety

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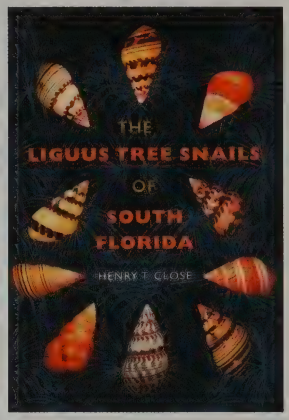
BOOK REVIEW

by Richard L. Goldberg, worldwide@erols.com

The Liguus Tree Snails of South Florida

By Henry T. Close



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In a recent conversation I had with a beginner conchologist, he commented on the dearth of available in depth literature about land shells. He felt that his interests in land shells would be greater if he could find more information about them. I have heard echoes of this statement for years, even after the publication of Tropical Land Shells (1987) and Compendium of Landshells (1989), both important books that helped bring land shells back to their former prominence.

Popular books dealing with regional land shells and particular non-marine molluscan Families have been almost non-existent. So it was with great satisfaction that I finally added a new book to my conchological library dealing with one of the most popular land shell groups, the Liguus.

"The Liguus Tree Snails of South Florida" by Henry Close (© 2000, University Press of Florida, ISBN 0-8130-1814-5) is an updated and much expanded version of the author's spiral-bound publication, "The Lure of the Liguus – The Florida Tree Snails" (Of Sea & Shore Publications), written almost a decade ago. Close (*pron.* as if being near) has been a long-time student of the Florida *Liguus*. With his years of experience collecting *Liguus* and formidable knowledge of the group, he has written a book that can best be described as a scholarly work written in a very casual and conversational style. I was amazed at now much information is crammed into this 161 page hardbound book.

Though I also consider myself a serious student and collector of land shells and *Liguus*, I was able to glean new tidbits of information about the Florida *Liguus* in every chapter. Did you know that the name *Liguus* refers to the banded pattern of the shell, which is so

pervasive in the group? The discovery of the color form *Liguus fasciatus vonpaulsoni* by Capt. C.C. von Paulsen, William Osment (*L.* f. *osmenti*) and Erwin Winte (*L.* f. *wintei*) did not take place while looking for *Liguus*, but while the three orchid enthusiasts were on an orchid expedition to Big Pine Key! South Florida Indian clothing after 1910 began to mimic the bright colors and patterns of *Liguus* color forms after the introduction of the sewing machine to their tribes. The clothing patterns were used as a means of identifying tribal clans during ceremonial dances. It is hypothesized that dark colored *Liguus* forms such as *L.* f. *castaneus* and *testudineus* prefer the shady central portions of hardwood hammocks since the dark shell coloring can absorb more heat from the sun than lighter colored shells, which tend to be found around the fringes of hammocks. The term hardwood hammock in South Florida, dense isolated areas of hardwood trees where *Liguus* inhabit, comes from the Arawakan word brought back to Europe by early Spanish explorers that refers to a hammock suspended between two trees. A plethora of other ecological, historical, and taxonomic information permeates the book.

Eight chapters and half a dozen appendices cover topics such as the popularity of *Liguus*, *Liguus* patterns used in Seminole clothing, shape and pattern, *Liguus* identification, hybrids and anomalies, distribution, the introduction of color forms to new habitats and dispersal of the *Liguus* in South Florida. Color plates, black and white pictures, maps and diagrams are included in the book. The pictures of *Liguus* in situ are most interesting.

One of the appendices includes a partial history of relevant *Liguus* references. Serious students of *Liguus* will find this information most useful, especially some of the more obscure references. Map reference materials, and a section on the classification of *Liguus* color forms in past literature round out the book.

Close considers the *Liguus* color forms more as a concept rather than a means for allowing overlapping characteristics that specific names can limit. The chapter on *Liguus* identification tackles the complexity of color forms. Of the 59 South Florida *Liguus* color forms, each is delineated with information about their type localities and habitats, related color forms, history, and an in depth description of each form. The identification chapter, which consumes more than half of the book, includes 8 double page color plates (actually 14 single page plates). In this chapter and the one dealing with shape and pattern, Close projects ideas about the relationship between color forms and discusses some of the more difficult concepts; overlaying colors and what primary color/pattern characteristics differentiate the color forms. He also hypothesizes as to why the species gave rise to these diverse color forms.

In the chapter on Introduction and Dispersal, Close discusses how weather and ecology have played a part in influencing the evolution of *Liguus* color and pattern, such as ocean level and hurricanes. Close provides information about extinct color forms and the reasons for their demise; for instance, a hurricane in 1935 destroyed the only habitat for *L.* f. *dohertyi* in the Florida Keys, causing the extinction of this color form.

Most naturalists believe that the *Liguus* were introduced to South Florida from Cuba after the Ice Age, some 21,000 years ago. Close cites other theories that consider the reverse migration, but states that the cold temperatures of that epoch would not have allowed the species to survive in South Florida. Close also addresses how the time and location when a color form arrived in an area has influenced color form evolution. He briefly touches on the dispersal of color forms introduced into new habitats by man, but stops short of theorizing about the dispersal in these new environments stating, that he does not have enough ecological information, but challenges us to speculate about this.

One concept not addressed, which may have added interest to the discussion of color forms is that of natural selection. Whether the concept is valid or not for the *Liguus*, it is a topic of research for other highly colorful and variable non-marine shells.

It should be noted that ever since the early pioneer *Liguus* collectors in South Florida began to amass their scientific collections of *Liguus*, there developed many proprietary theories about the identification and relationship of *Liguus* color forms. Not every serious *Liguus* student will agree with Close's treatise or others approaches for that matter. None-the-less, Close has done a highly admirable job in demystifying the South Florida *Liguus* color forms.

In an epilogue chapter, Close puts aside the science and technicalities of studying *Liguus* to impart a more spiritual focus on one of nature's wonders. Since the mid-1980's the field collection of *Liguus* has been banned, with serious penalties imposed for those caught doing so. Close has put the relevance of these color forms not in the perspective that they provide any benefit to the snails themselves, but as objects of beauty and awe for people to better appreciate the wonders of nature.

Byne's Disease – questions and answers

by Paul Callomon
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1. What is Byne's disease?

It's a name that describes damage inflicted on shells by acid vapors. It honors Loftus St. George Byne, who published the first paper on the subject in 1899. Most of his conclusions were wrong – he thought bacteria caused the problem - and the treatments he prescribed were either useless or actually dangerous, but the name stuck.

2. Where do the vapors come from?

The vapors are emitted naturally by wood and other cellulose-based materials such as cotton, paper, cardboard, chipboard, plywood, Masonite, sawdust and cork. They are a product of the natural decay of cellulose.

3. What happens?

The main aggressors are acetic and formic acid, both of which are volatile – that is, they actively float out into the air as vapor at room temperature. The vapor attacks the calcium carbonate of the shells, turning it into a calcium acetate/formate compound salt. The specimen becomes scarred, and is eventually destroyed. The higher the humidity and temperature, the faster the reaction.

4. What role does humidity play?

The acid fumes readily dissolve in water, turning ordinary water vapor into acidic vapor. One problem is that the salts that form on the surface of an afflicted shell are themselves hygroscopic – they attract water. In sucking in water vapor from the surrounding air, therefore, they also draw more acid into the reaction than would normally arrive in a drier environment.

5. How can I tell whether my shells have Byne's disease?

After a while, a white powder or clumps of white crystals will become visible on the shell surface. Favorite spots are in the sutures of gastropods and among the ribs and grooves on bivalves. You may have to look hard or use a lens to see anything at first, but in bad cases the whole specimen can eventually become covered with white fur. Touch the crystals with the tip of your tongue. If there is a strong taste of vinegar (acetic acid), this normally indicates Byne's disease. A sour smell when you first open a drawer is another telltale. Red herrings: some specimens have a white film on them naturally, especially if they came from sand or mud bottoms, and some glossy shells 'film over' for other reasons. Coralline algae can also form small white patches that may look like Byne's disease. In all cases, however, the taste test is very reliable.

6. Are some species especially prone to Byne's disease?

Apparently not, as I have seen Byne's disease in marine, freshwater and land shells. Cones, cowries and volutes all get it, as do smaller groups such as Triphorids and Turrids. I've seen it in most bivalve groups too. Small, highly sculptured gastropods seem to get it quite often, and this may be due to the presence of sea salt residues on and inside the shell. Ordinary salt is hygroscopic, which means that it attracts and absorbs water vapor from the air. Within a wooden case, this vapor may already have been turned sufficiently acid by the fumes to set off Byne's disease. Though this theory is not yet proven, it is best to thoroughly soak, wash and dry all marine specimens before putting them in your collection.

7. How can I treat specimens that have the disease?

Soak them in fresh water for 24 to 48 hours to break up the crystals, then wash them in running water with a toothbrush and dry them thoroughly. This will stop the reaction and remove the salts from the surface. You cannot restore the corroded areas, but as long as you don't put the shell back into the same environment then things should not get worse.

8. How can I prevent specimens getting Byne's disease?

Ideally, don't store them in wooden drawers or cardboard boxes. If you must, then isolate them from the vapors by putting them in glass vials with plastic stoppers, or in Ziploc bags. Open all the drawers regularly to release the fumes. Use a dehumidifier in the room and silica gel desiccant in each drawer to try and reduce humidity. You can monitor temperature and humidity with simple instruments available from the greenhouse department of any big home store chain. The environment within the average shell collection is a balance of several factors. On the one hand, wood gives off acid fumes; on the other, however, it absorbs water. Humidity within a well-sealed wooden cabinet is thus usually lower than in the surrounding room. On balance, it's better to store your shells in metal, glass or plastic than in wood, but if you live in a very humid climate bear in mind that these materials will offer no protection from other humidity-associated problems such as mold. If your collection is big enough to warrant it, you may have to look at dehumidifying the entire room. Though I don't advise it for any specimen that may one day be offered to a museum collection, oiling specimens is known to reduce the likelihood of Byne's disease.

9. Are some woods worse than others?

Oak is apparently the worst wood for causing Byne's disease. This is not surprising, as oak is corrosive enough to destroy iron and steel screws. All woods can cause Byne's disease, however, and plywood, fiberboard and Masonite are just as bad. The age of the wood doesn't seem to matter much, and it can continue to give off fumes for decades. Ordinary paper usually gives off acid too – some of it from the wood pulp, and more from the sulfides used to bleach the paper. Testing pens are available at art supply stores that will tell you whether paper or card is acidic or not. If you can, enclose your acidic labels in Mylar envelopes or small Ziploc bags. Laminating them (like ID cards) is probably not a good idea, as the long-term stability of laminated paper is in some doubt, and separating them from the specimens risks chaos.

10. Does painting the wood help?

It should, though unless the paint forms an unbroken barrier then some vapors are still going to get out. As the seasons change, wood stretches and shrinks. New paint can keep pace with this movement for a time, but sooner or later cracks will appear as the paint loses its aromatic elements and hardens. Still, it's probably better to have some paint cover than to have plain wood exposed. People have tried using flexible latex paint, with some success, but in any case if your drawers don't have separate metal runners then the paint will wear off wherever the drawer slides against the cabinet. Paint will make the drawer slides stick, too. Obviously, so-called microporous paints and varnishes are of no use, as they allow vapors to pass freely through them.

More detailed information on Byne's disease has been published. Sally Shelton's excellent roundup of research and publications on the topic was reprinted in the Internet Hawaiian Shell News for August 1999. The IHSN can be viewed online at http://home.att.net/~w.thorsson/index.html.

An excellent technical paper on the chemistry of Byne's disease is 'The deterioration of Mollusca collections: identification of efflorescence' by Norman Tennent and Thomas Baird. Studies in Conservation vol. 30 (2), 1985: 73-85. This contains some great color plates of really horrible cases. Back issues of this publication can be ordered from the International Institute for Conservation at http://www.iiconservation.org/publications/publications.html

A turrid (*Compsodrilla* cf. *duplicata*) from Sonora, Mexico with Bynes (left) and after scubbing and heavy oiling (right). The surface is pitted and dull. Photo by Tom Eichhorst.

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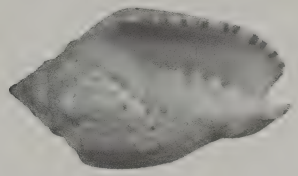

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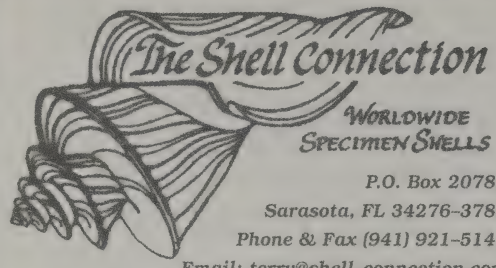

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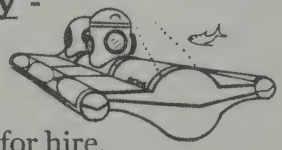

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Oops:

The article by Karen VanderVen in the last issue (Riding Shotgun on the Mollusk Coast: A Yucatan Shelling Adventure) was mistakenly credited as article and photos by Karen VanderVen and photo editing by Jim Miller. Karen wanted this corrected as Jim was responsible for the excellent photographs as well as the photo editing.

Indonesia continued from page 5

Wallace is considered the father of zoogeography. While in the islands in 1855, he formulated his theory of Natural Selection – "On the Law which has regulated the Introduction of New Species" and in 1858 "On the Tendancy of Varieties to Depart Indefinitely from the Original Type." This latter paper was presented to the Linnaean Society of London and explained the principle of natural selection in the evolution of species. It was these papers that helped Darwin understand the mechanism of evolution and prompted him to publish The Origin of Species, although he never acknowledged the role Wallace played in crystallizing his theory and received all of the credit himself. * Returning to our subject of mollusks, I must also mention Professor Albert S. Bickmore of New York who collected shells in Indonesia in 1865 and 1866 on many of the islands visited by Wallace. I am trying to find a copy of his book, *Travels in the East Indian Archipelago* (London, 1868). Wallace in his book the *Malay Archipelago* tells of his visit to Amboyna in the Molucca Islands where he saw an impressive collection of about 10,000 specimens of marine shells. He estimated there were about 1,000 species. He recalls the shells were an object of trade and that many of the local residents made their living from collecting and cleaning shells.

I am not a scuba diver and therefore missed out on a wide selection of scuba diving sites; some considered the most interesting in the world. I can only recommend to all of you to visit this shell collector's paradise.

* [Ed. Note. There are actually several different interpretations of the Wallace – Darwin controversy. Darwin had in fact been working for 20 years on his theory of evolution and, although he and Wallace had exchanged correspondence for two years, he was quite surprised when he received the paper by Wallace. Realizing that Wallace had many of the same ideas he was working on and not wanting to rush his book to a premature publication, he asked well-known naturalists and authors, friends Charles Lyell and Joseph Hooker, what to do. They recommended both Darwin's and Wallace's papers be presented together at the next meeting of the Linnaean Society. In fact, Darwin could have sat on Wallace's paper and just presented his own theory. By the time Wallace returned from Indonesia (four years later) his paper would have been irrelevant. But Wallace's paper and Darwin's were presented at the same convention, 18 months before Darwin published his *Origin of Species*. Wallace was reportedly quite pleased when informed of Darwin's actions. Unfortunately, the correspondence from Wallace to Darwin has not survived and many questions remain unanswered. Both men were great naturalists and larger than their times. And both men were honest and gracious enough to admit the qualities the other possessed.]

New Insights on Bivalve Evolution

By
David Campbell

For the past several years, my research has focused on the evolution of the Class Bivalvia. Although it is the second-most diverse class of mollusks, almost all bivalves have the same basic body plan. As a result, convergent and parallel evolution are common. However, many traditional classifications emphasize a single organ or feature, regardless of other evidence for convergence. As a result, multiple classifications exist for almost every bivalve superfamily. I used new data and new methods to try to gain insights into bivalve systematics and evolution. The new data included DNA sequences and morphological data, which I analyzed using cladistic techniques. As these are unfamiliar to many collectors, I will briefly describe these methods before discussing some current results of these studies.

Cladistics

Cladistic analysis tries to provide a more objective method of reconstructing evolutionary history than the traditional approach of simply looking at the data and deciding what seems plausible. It starts with explicit definitions of the features (called characters) of the organisms under study. For each character, you need to determine the character state for each taxon [the name applied to a taxonomic group, such as a family, genus, or species]. For example, one character might be the "number of valves in the shell". The character state for *Pecten* or *Berthelinia* would be "two"; for *Strombus* or *Neopilina* it would be "one"; for *Chaetoderma* or nudibranchs it would be "zero"; and for *Chiton* it would be "eight". Mathematical analysis of the data then generates an evolutionary tree. A group of taxa associated on an evolutionary tree is called a clade (hence the name, cladistics). The most popular method of cladistic analysis is maximum parsimony. This tries to minimize the amount of evolutionary change that occurs in the entire evolutionary tree. In the previous example, parsimony would group together the taxa that have the same number of valves. However, other evidence indicates that the two-valve and zero-valve examples are convergent, and parsimony is misled by these data. Thus, the choice of data to include in an analysis is very important. Maximum parsimony can be used on almost any sort of data, and the principle of minimizing the amount of assumed evolutionary change is intuitively appealing, even though it does not hold up in some circumstances. Several cladistic methods of generating and testing evolutionary trees exist, but many apply only to certain types of data (*e.g.*, DNA sequences). Most methods require a lot of computer time and memory, especially if you are analyzing many species.

Descriptions of cladistic analyses tend to use intimidating-looking technical terms. I will define some of the most important ones and will use some of them later. A monophyletic taxon is one that includes all the descendants of a single ancestor and the ancestor itself. For example, most workers agree that all gastropods descended from a single ancestor. Hard-core cladists want to only recognize monophyletic taxa. A paraphyletic taxon includes some, but not all, of the descendants of a single ancestor, and also includes the ancestor. For example, all Archaeogastropoda are descended from the common ancestor of gastropods. However, Archaeogastropoda includes the ancestors of other gastropod subclasses, and some living archaeogastropods are more closely related to non-archaeogastropods than they are to some archaeogastropods. Finally, polyphyletic taxa do not all have the same common ancestor. Almost everyone agrees that polyphyletic taxa are bad. For example, a taxon grouping all shell-less mollusks and excluding all shelled mollusks would be polyphyletic. On an evolutionary tree, a monophyletic taxon will include everything above a certain point in the tree. A paraphyletic taxon will have all its taxa connected, but will be missing some taxa above its point of origin. A polyphyletic taxon will include two or more separate parts of the tree (Fig. 1). Two monophyletic taxa are called sister taxa if they are each other's closest relative.

DNA Analysis

Analysis of DNA sequence data requires collection of appropriate samples, extraction of the DNA, amplifying the gene of interest, sequencing it, and aligning the sequences before finally performing a cladistic analysis. Although collecting samples for DNA sequencing requires some special techniques, it is the easiest way for the average collector to participate in this sort of research. I received several useful specimens from collectors on the Conch-L list and remain interested in any material that people send. The analyses cost about $50 per sequence, so the grant from COA was very helpful in funding my research.

DNA breaks down rapidly after death, so specimens must be kept alive or rapidly preserved. Probably the handiest way to preserve tissues for DNA

work is to immerse the specimen in concentrated ethanol. The ethanol must penetrate the tissues rapidly, so I often cut open the shells of bivalves to prevent their closing tightly. In addition, water in the tissues will dilute the ethanol, so use plenty of ethanol. Changing the ethanol after a day or two is also a good idea, to replace the by now somewhat diluted ethanol. Keeping the preserved specimens cold is helpful, but not necessary for the duration of a field trip or for mailing a sample. Several other recipes exist for preserving DNA, but these typically require specialized chemicals or supplies (*e.g.*, liquid nitrogen and a freezer that stays below –80° C). For a mollusk larger than a few cm long, a small part of the specimen will still yield plenty of DNA. Muscle tissue is good. Mantle tissue is generally harder to work with because the mucous can interfere with the DNA extraction. Likewise, the digestive tract may be a problem because it can contain DNA from the food. For preserving DNA, ethanol should probably be at least 70-75% (140-150 proof). Because live mollusks contain a lot of water, it is better to use a concentration well above this minimum. Labeling and transporting the specimens with ethanol can also be challenging. Most ink, including that of permanent markers, dissolves in ethanol. Pencil does not dissolve, or you can try to keep ethanol off the label. I have also found some zip-closure bags that seem watertight but leak ethanol. This has been a problem with cheap bags but not brand-name ones. However, plastic jars are safer, if they seal well. Double bagging is also good. Make sure containers and specimens are well padded for mailing; otherwise, they may be crushed, letting the ethanol leak out. This not only may ruin the specimen but also makes the package smell strange. One way to reduce the need for ethanol in a package is to pack the specimen (already well-preserved) with paper towels, cotton, or other absorbent material that is soaked in ethanol. This will keep the specimen from drying out without requiring you to ship lots of liquid ethanol.

You may remember from biology class that DNA is a nucleic acid (in contrast to the proteins, carbohydrates, and fats that are other important components of living organisms). It has two long strands, which consist of a string of smaller molecules, called bases, attached together. The sequence of bases encodes genes. The analysis of DNA sequences uses these features.

When the specimen gets to the lab, the tissue is ground up and mixed with a solution to break down the tissue and dissolve the DNA. Several chemical steps are required to separate the DNA from the rest of the material making up the organism. The DNA is then amplified using the polymerase chain reaction (PCR). PCR is an engineered version of bacterial DNA copying. The DNA sample is added to a miniature test tube containing a DNA-copying enzyme and all the chemicals that it needs to function. This mix includes plenty of DNA bases (four kinds, abbreviated A, G, T,and C), as well as short "primer" stretches of DNA that bind to the ends of the gene that you want to sequence. The enzyme copies DNA, starting at a primer sequence. This mix is first heated to separate the original DNA strands. It is then cooled to allow the primer to attach to the DNA, and then the sample is kept at a suitable temperature for the enzyme to work. This is repeated about 30 times, each step taking about 30 seconds to 2 minutes. Because each new copy of the gene can serve as a template for the next round of copying, the process produces up to a million copies. This is why a small sample of tissue taken from a fishing boat is enough to prove that they were harvesting a protected species of abalone, for example.

The DNA sample produced by PCR (if the process worked) is purified and then sequenced. The sequencing reaction resembles PCR, with slight modification. In the standard sequencing process today, the reaction mixture includes all the standard ingredients for PCR plus some modified bases, labeled with a dye. Each kind of base has a different color. The enzyme cannot attach another base to a dye-labeled base, so the new copy ends at that point. The result is a mixture of sequences ending on A with one color of dye, sequences ending on T with another color, *etc*. The samples are then run on an electrophoresis gel or capillary tube. The gel is a gelatin-like slab, with holes in one end to hold the samples. When an electric current is applied to the gel or tube, the DNA migrates towards the positive terminal. Smaller DNA molecules can move more quickly. Thus, after running the gel for a while, the shortest DNA pieces will have moved the farthest. As a result, the first band on the gel will have the dye for the first base in the sequence. The same principle applies to the capillary tube, but in that case the DNA travels through the thin glass tube rather than through a gel. In automated sequencing, a computer scanner (similar to a UPC code scanner at a checkout line but more expensive) measures the color as the DNA moves past and sends the data to a computer. The computer produces a chart of the scanning results, along with its guess at the sequence of bases. However, it is necessary to manually check the computer's guesses against the chart.

You can look up published sequences (and some unpublished ones) online. GenBank at http://

www.ncbi.nlm.nih.gov/Taxonomy/taxonomyhome.html/ is the US national database for gene sequences. Data are shared with the European and Japanese databases, so you can look up data submitted to any of them in any one. Most journals and book publishers require that you submit sequence data to GenBank before you can publish a study based on new molecular data. The Taxonomy browser will be of most interest to the average collector, as you can check if your favorite taxa have been studied. You can enter a genus or species, or you can enter a more general name (*e.g.*, Mollusca) and then follow the classification down to more specific levels. Several taxa have a few genes already sequenced, but no molluscan genome project is currently planned. You will also probably notice points at which the GenBank taxonomy needs some work, and there is an email address to which you can send corrections. Molecular biologists have a bad reputation for taxonomic incompetence, which is sometimes justified.

Once the sequences are obtained, they must be aligned with each other and analyzed. Possible mutations include insertions and deletions as well as a change from one base to another, so alignment can be difficult. The challenge in planning a molecular study is to guess what gene will have enough mutations to differentiate taxa in the study without being so variable as to be unmanageable. Different genes evolve at different rates and with different evolutionary constraints, so different genes will be better for different studies. For example, the spacer regions between genes are typically highly variable, and might be examined to determine population-level patterns. They would be a likely place to start for a study determining whether two forms belong to the same species, for example. However, they would probably be so variable as to be useless to try to look at relationships between superfamilies. It's a good idea to look at multiple genes to test whether the results are well supported. Popular genes for studies on mollusks include the relatively slowly evolving 18S gene (with some faster-evolving parts), the 28S gene, with generally medium rates of evolution, the faster-evolving COI, 12S, and 16S genes, and the rapidly-evolving ITS1 and ITS2.

Molecular data are subject to many of the same problems as morphological data for evolutionary studies. Convergent or parallel evolution can occur. Thus, it is necessary to consider the possible evolutionary effects of changes, just as when you study morphological features. For example, a gene coding for an oxygen-carrying molecule might be similar in unrelated species that live in low-oxygen environments. Also, a valid evolutionary comparison must compare features that evolved from the same ancestor. This is called homology. For example, shell shape in siphonariid limpets, true patellid limpets, and fissurellids is similar, but other evidence indicates that this evolved multiple times from an ancestrally coiled shell, and so is not homologous. Identifying homology can be a problem for molecular studies due to gene duplication. Often, a stretch of DNA will be copied and maintained as duplicates in the genome. Usually, only one copy is needed, so mutations in one copy will not harm the animal. If you sequence one copy from one animal and another copy from another animal, you might be mistaken about the relationships.

This is a particular problem for many bivalves, in which mitochondrial DNA (mtDNA) has an unusual inheritance pattern. Mitochondria are organelles that supply energy to the cell. They have their own DNA, which in most animals is inherited only from the mother. However, most male bivalves also inherit mtDNA from their father, so that males have two types of mtDNA (in different tissues). As a result, studying mtDNA might make females of different species appear more closely related than each to the corresponding male. It gets even more confusing because occasionally the mitochondria get shuffled around and the female lineage may be inherited paternally or *vice versa*. This is rare, but should be considered when mtDNA gives strange results.

Another problem of molecular studies is called long branch attraction. Because DNA has only four bases (A,G,T, or C), two random DNA sequences will have some similarity. If two DNA sequences have evolved too much, they will be nearly random relative to each other. Random similarities may then outweigh the evolutionarily meaningful ones. This is especially likely if one of the organisms in the analysis is not closely related to any of the others, thus forming a long branch on the evolutionary tree. This can be solved by analyzing a gene that evolved more slowly, by using specialized analytical techniques that compensate for high evolutionary rates, or by studying additional taxa so that everything has close relatives in the analysis.

With all these problems, why use molecular data? There are two important reasons. First, it provides a new source of information, largely independent of traditionally studied morphological features. This is particularly important for organisms that have a highly specialized morphology, difficult to compare with other organisms. Likewise, taxa with either very high or very low morphological variability may have genes that evolve at a more useful rate. Secondly, genes provide a lot of

data. Most animals have millions of DNA bases. Putting together molecular and morphological data provides the best approach. Each helps correct and check the other.

At the species level, molecular data can help determine whether physical differences are associated with a genetic barrier or just variation within a population. In some cases, morphologically similar populations prove to have very different DNA, suggesting that they represent multiple species. This is most commonly discovered in the case of taxa with supposedly very wide ranges. Other morphologically variable populations show no clear differences in their DNA. However, you cannot use a certain level of DNA difference to prove that two individuals are different species or subspecies. Some taxa have high levels of DNA variation whereas others show very little. Variation within and between populations must be examined to determine what level of molecular difference is significant.

What are the taxonomic implications?

As conventional classifications already disagree, it's not too surprising that the new analyses have not resolved everything, either. Studies range from the population level to all organisms, including bacteria and mollusks in a single analysis. As a result, some existing classifications have changed, whereas others are supported. Some species have been demoted to subspecies or varieties, while other varieties and subspecies have been elevated. In a few cases, previously unsuspected variation has been found.

The relationships of Mollusca to other phyla have received some elucidation from molecular data, though the picture remains somewhat murky. Mollusca appears most closely related to phyla that share protostome development (a distinctive pattern of early embryonic development) and that lack a regularly molted cuticle. Most of these other phyla are worms. Annelida (polychaetes, earthworms, and leeches), Sipunculida (peanut worms), Echiura (spoonworms), and Brachiopoda (lamp shells) are among the other members of this group. Most of these (including Mollusca) have a distinctive type of larva called a trochophore, so the group is sometimes called Trochozoa.

Relationships within the Mollusca are not yet clear. Only two published sequences exist for aplacophorans, with only a handful for scaphopods and none for monoplacophorans, so the class-level representation is inadequate to give good resolution in molecular analyses. Morphological studies have produced varying results, but in general it seems as though aplacophorans and polyplacophorans are the earliest living offshoots from the main line of molluscan evolution. The remaining mollusks are grouped as Conchifera ("shell-bearers"). Among living groups, the living monoplacophorans seem to be relatively distantly related to the other conchiferans, although for fossils "monoplacophoran" is often used to refer to any of the primitive conchiferan mollusks that do not obviously belong to any other group. These include the ancestors of the other classes. The bivalves appear relatively distinct from the gastropods, cephalopods, and scaphopods, which show several similarities. My research emphasized the bivalves, but other studies address the other classes.

In the Bivalvia, most of the major divisions recognized by morphological studies are also supported in molecular studies (Figure 2). However, some widely-accepted taxa appear polyphyletic, including Myoida, Lucinoidea, Corbiculoidea, Veneroidea, Mactroidea, Arcticoidea, Malleidae, *Barbatia*, and many unionid genera. Many of these taxa were suspected already on morphological grounds. Both molecular and morphological data support the inclusion of *Tridacna* and *Hippopus* within Cardiidae. The biggest surprise comes from the worm-like, nearly featureless *Xenoturbella.* This previously enigmatic animal has DNA and developmental features that point to a close affinity to protobranch bivalves. Some taxa, such as protobranchs, have not received as much study as other bivalves, largely because of the difficulty of obtaining specimens. Many key groups only live in deep water.

Previous classifications often proposed a wide range of mutually conflicting ideas. Both DNA and morphological studies can help resolve these issues. Within the Bivalvia, Ostreoidea has alternatively been grouped with Pterioida or Pectinoida. DNA and new morphological and fossil data strongly favor the Ostreoida-Pterioida grouping while placing Plicatuloidea in Pectinoida.

Despite all these studies, the results remain relatively preliminary. The constant rapid improvements in methods and computing ability keep any analysis from being the final word, and many important groups remain poorly studied. Thus, these methods will be providing important revisions to molluscan systematics, but don't change your labels with every new idea. The rapid changes and new discoveries also make this an exciting field for research. Thanks again for your support!

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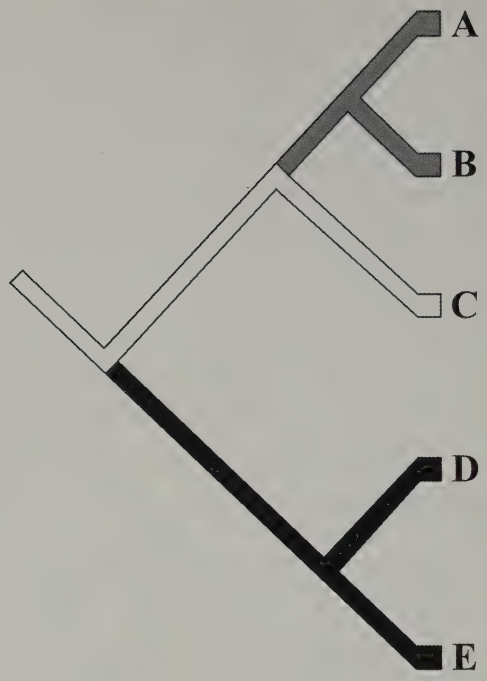


Figure 1. Monophyletic taxa. AB, ABC, DE, and ABCDE are all monophyletic.

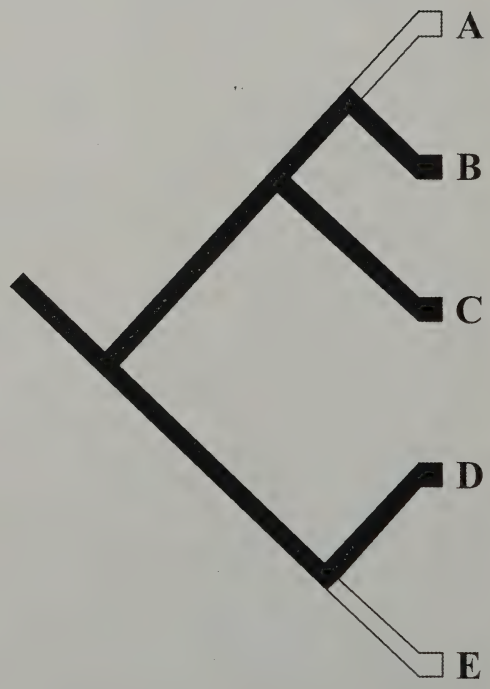
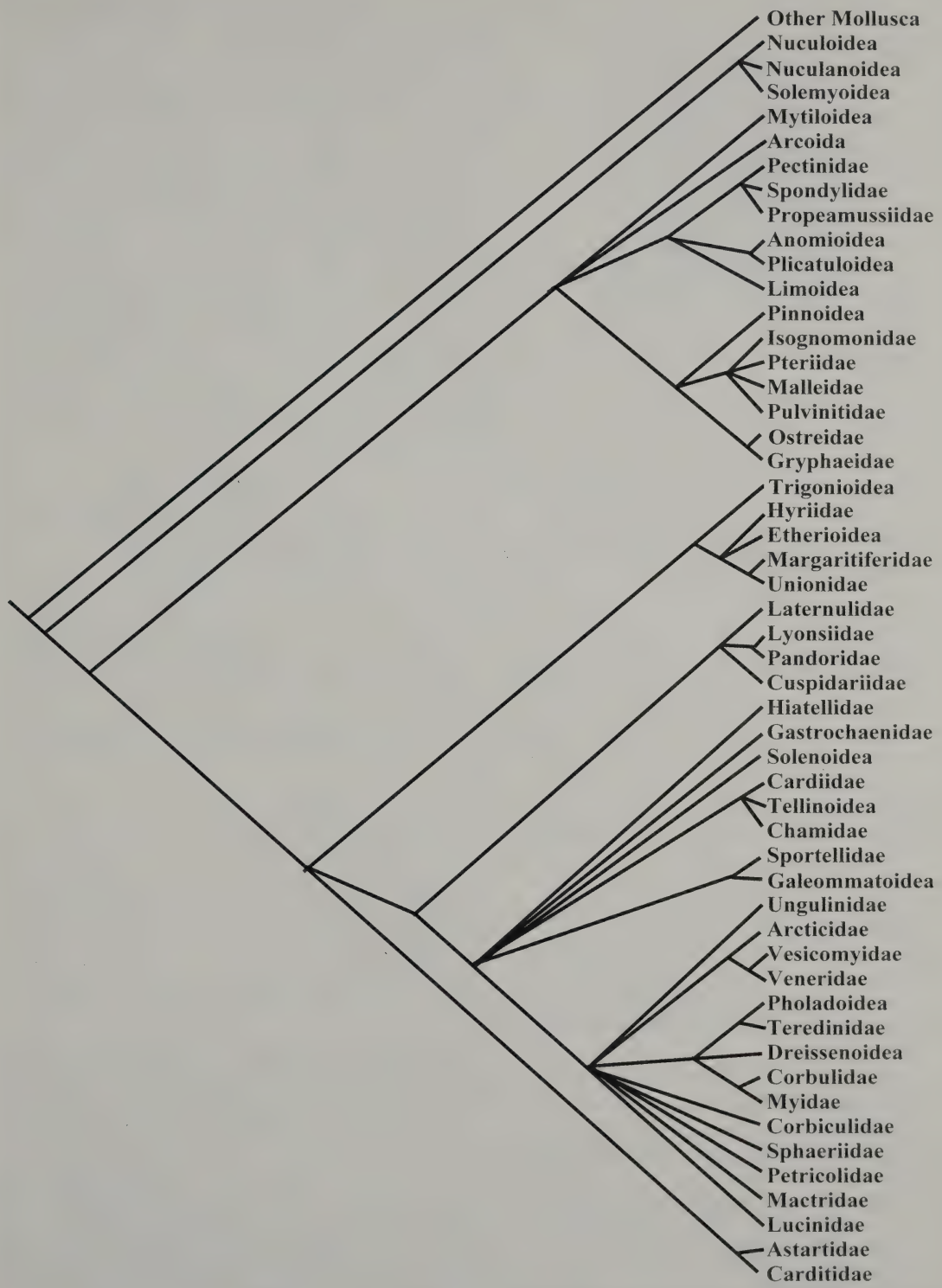


Figure 2. Paraphyletic and polyphyletic taxa. BCD is a paraphyletic taxon. AE is polyphyletic if it excludes the ancestors (i.e., it only includes the white parts of the tree).

Figure 3. (Opposite page) This shows my current thoughts on the classification of modern Bivalvia. Some groupings are well-supported, others highly speculative.


Other Mollusca
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Nuculanoidea
Solemyoidea
Mytiloidea
Arcoida
Pectinidae
Spondylidae
Propeamussiidae
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Plicatuloidea
Limoidea
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Cardiidae
Tellinoidea
Chamidae
Sportellidae
Galeommatoidea
Ungulinidae
Arcticidae
Vesicomyidae
Veneridae
Pholadoidea
Teredinidae
Dreissenoidea
Corbulidae
Myidae
Corbiculidae
Sphaeriidae
Petricolidae
Mactridae
Lucinidae
Astartidae
Carditidae

2003 SHELL SHOWS & RELATED EVENTS

Jan. 17-19 - SPACE COAST SHELL FESTIVAL, Melbourne, FL
The Melbourne Auditorium, 625 E. Hibiscus Blvd.
Jim & Bobbi Cordy, 385 Needle Blvd.
Merritt Is., FL 32953
E-mail: cordy@yourlink.net (321) 452-5736

Jan. 31 - Feb. 2 - BROWARD SHELL SHOW, Pompano Beach, FL
Pompano Beach Recreation Center, NE 18th Av. & NE 6th St.
Jim VunKannon, 2219 NE 16th Court
Ft. Lauderdale, FL 33305 (954) 561-0120

Feb. 7 – 9 - SARASOTA SHELL SHOW, Sarasota, FL
Sarasota Municipal Auditorium, Tamiami Trail
Lynn Gaulin, 3417 58th Ave.
W. Bradenton, FL 34210
E-mail: ehgaulin@worldnet.att.net (941) 755-1270

Feb.14-16 - NAPLES SHELL SHOW, Naples, FL
The Nature Conservancy, 14th Avenue N.
Gary Schmelz, 5575 12th Ave. SW
Naples, FL 34116
E-mail: schmelz@att.net (941) 455-4984

Feb. 21-23 - ST. PETERSBURG SHELL SHOW, Treasure Is., FL
Treasure Is. Community Center, 1 Park Place
Bob & Betty Lipe, 348 Corey Avenue
St. Petersburg Beach, FL 33706 (727) 360-0586; FAX: 360-3668
E-mail: rlipe1@tampabay.rr.com.
Exhibits accepted at web site: http://web.tampabay.rr.com/shellclub

Mar. 7 - 9 - SANIBEL SHELL SHOW, Sanibel, FL
Sanibel Community Center, Periwinkle Way
Anne Joffe, 1163 Kittiwake Circle
Sanibel, FL 33957
E-mail: Sanibel@aol.com (239) 472-3151

Mar. 13-15 - MARCO ISLAND SHELL CLUB SHOW XXII, Marco Is., FL
Wesleyan United Methodist Church, Barfield Road
Jean Sungheim, P.O. Box 633
Marco Island, FL 34146 (941) 642-7247

March 1 - 2 - XVéme RECONTRES INTERNATIONALES DU COQUILLAGE
Espace de Blanc Manteaux, 48 rue Vieille-du-Temple, Paris, France
M. & D. Wantiez, 88, Rue du General Leclerc
95210 Saint Gratien, France
E-mail: wantiez.mada@libertyserv.fr 33 (1) 34-17-00-39

May 3 – 4 - XIII BELGIUM INTERNATIONAL SHELL SHOW, Antwerp, Belgium
Schijnpoort, Schijnpoort Straat
R. De Roover, Vorsterslaan 7
2180 Ekeren-Donk, Belgium
E-mail: bvc.deroover@village.uunet.be 32 (3) 644-3429

May 3 – 4 - CENTRAL FLORIDA SHELL SHOW, Orlando, FL
Central Florida Fairgrounds, Exhibition Hall A, 4603 W. Colonial Drive
Phyllis Gray, 1212 S. Eola Drive
Orlando, FL 32806
E-mail: pgray@kennesaw.lawco.com (407) 422-0253

May 24-25 - SUNCOAST CONCHOLOGISTS SHELLERS' JAMBOREE, Largo, FL
Honeywell MinnReg Building
6340 126th Ave. North, Largo, FL
Sharlene Totten, 2252 Springflower Drive
Clearwater, FL 33763
E-mail: CEShell@aol.com (727) 734-2029

Jun. 20-22 - GULF COAST SHELL SHOW, Panama City, FL
(Date & location subject to confirmation)
Linda Brunner, P.O. Box 8188
Southport, FL 32409
E-mail: liji@earthlink.net (850) 265-5557

Jun. 26-29 - AMERICAN MALACOLOGICAL SOCIETY MEETING, Ann Arbor, Michigan
Diarmaid O'Folghil, Univ. of Michigan, Museum of Zoology
1109 Geddes Avenue, Ann Arbor, MI 48109
E-mail: diarmaid@umich.edu (734) 647-2193

Jul. 12-13 - KEPPEL BAY SHELL SHOW, Yeppoon, Queensland, Australia
Jean M. Offord, 277 McDougall St.,
N. Rockhampton, Qld. 4701, Australia 61 (7) 4928-3509

Jul. 17-21 - CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION, Tacoma, WA
Tacoma Sheraton Hotel, Tacoma
Tom Rice, P.O. Box 62
Port Gamble, WA 98364
E-mail: ofseashr@sinclair.net (360) 297-2426

Jul. 19-20 - TOWNSVILLE SHELL SHOW, Townsville, QLD, Australia
Cutharinga Bowls Club on Harold Street, West End
Glenda Rowse, 19 Farrell Street
Kirwan 4814, Queensland, Australia 61 (7) 47 73 28 17

DONALD DAN, COA Award Chairman
6704 Overlook Drive
Ft. Myers, FL 33919, U.S.A.
Tel. Voice & Fax (239) 481-6704
E-mail: donaldan@aol.com

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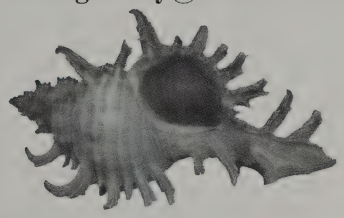
http://mywebpages.comcast.net/geduffy/shell/index.html/

Glenn Duffy
4874 Cherry Laurel Circle
Sarasota, FL 34241
Tel: 941-923-1500, Fax: 941-923-7773
e-mail: geduffy@comcast.net



IT'S ALMOST TIME! DUES FOR 2003!

As last year, dues renewal forms will be sent by direct mail instead of enclosed in the magazine. Some members have paid ahead and will not receive a form. You can tell the year your dues are paid through by checking the address label on your magazine envelope. We appreciate your prompt response, as sending reminder notices is an expense we would prefer to avoid!

If you have a change in address or name, please notify me promptly. Most members receive their magazine by Bulk mail - which the Post Office does NOT forward. Thank you!

Doris Underwood
COA Membership Director
698 Sheridan Woods Drive
Melbourne, FL 32904-3302
dunderwood1@cfl.rr.com

Jordan Star's Web Picks

★= poor, ★★= fair, ★★★= good,
★★★★= excellent, ★★★★★= outstanding.

It's logical to start with this site.

★★★★★ - Conchologists of America — Conch-Net HomePage, http://coa.acnatsci.org/conchnet/; Easy to navigate and understand, not cluttered, much information, many links, some graphics, great for kids.

★★★★ - Encyclopedia Smithsonian:Mollusks Regional Marine, http://www.si.edu/resource/faq/nmnh/mollregm.htm; much info., no graphics, mostly a book list.

★★★★★ - Molluscs Net: shell collectors, shell dealers, shell clubs, seashells, http://www.molluscs.net; many, many links, can spend a day navigating site, great for kids.

★★★ - Famous Malacologists, http://www.inhs.uiuc.edu/~ksc/Malacologists/FamousMalacologists.html; mostly biographical info., some graphics, incomplete list, good to familiarize oneself with the authors.

★★★★★ - Sea and Sky, http://www.seasky.org/; many, many graphics, can spend a day exploring site, very fascinating site, not only a site for shells, excellent for everyone!

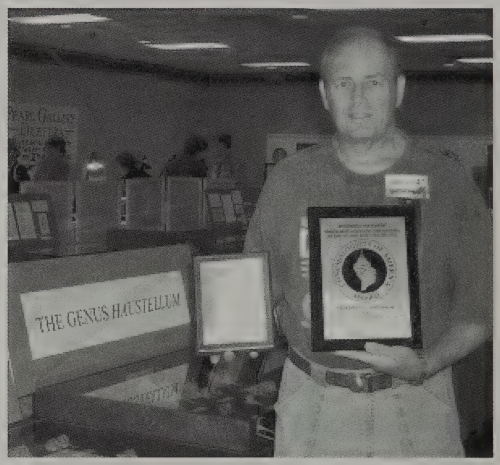
Links good/work as of 8-5-02

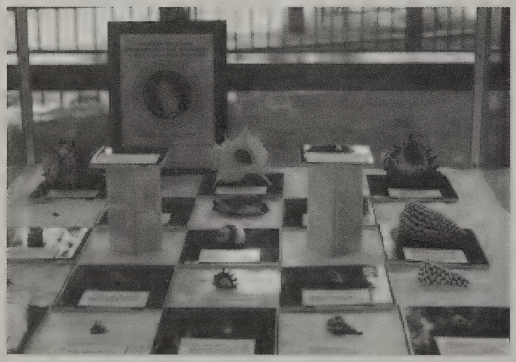
COA Winners Page

Edited by Charlotte Lloyd

COA Member Ray Wichus won his COA Award at the St. Petersburg Shell Show held on February 22-24 of this year. Ray's 20-foot exhibit "Worldwide Shells" was filled with beautiful shells from around the world.

On July 6-7 of this year Gene Everson won the COA Award for his exhibit, "The Genus Haustellum" at the Jacksonville Shell Show. This beautiful exhibit housed many world-record sized specimens. Gene was also awarded the Shell-of-the-Show for a remarkable *Haustellum wilsoni*.





Judy Barrick of the Oregon Conchologists Society won her COA Trophy at the Oregon Shell Show held on July 23-28, 2002. Judy's exhibit "It's As Simple as Black and White" was comprised of black ceramic tiles over a white sand base with black and white shells for a wonderful graphic effect. Congratulations, Judy!

At the Keppel Bay Shell Show of Queensland, Australia held on July 13-14, Jean Offord won the COA Award for her exhibit "40 Shells with Red Tonings." This display was to celebrate the 40th (Ruby) Anniversary of the Keppel Bay Shell Club. Jean is pictured below (center) with her two grandsons, who won the Junior Division and Kirsten Livermore, Federal Member for Capricornia, who officially opened the Show. Congratulations, to all three exhibitors!

The Secrets of Margarita Island continued from page 7.

of tulip that comes in solid chocolate, red or yellow colors with or without contrasting yellow or brown spiral bands.

Moving further eastward—to the north side of Macanao, is a little fishing village nestled along the lee side of Punta el Tunal. This was our first stop of the day and all 20+ of us filed out of the bus right in among the fishermen's shacks. Local children quickly caught on to our purpose and were soon offering shells for Bolivars, the local currency. Here in just a foot of water at low tide, and among the *Thalassia*, were *Voluta musica*. The columbellids *Nitidella nitida*, *Rhombinella laevigata* were common in the drift line on the shore where a couple of *Haustellum donmoorei* were also found. The fishermen may have dumped these normally deeper-water species close to shore. On the western side of Macanao we visited Boca de Pozo, a sprawling town of wall-to-wall court-yarded stucco homes and stores. On the bay were fishermen's homes and shacks and beached boats, of course, and here along the narrow beach we again encountered new species: large specimens of *Mactra alatus*, live *Chicoreus brevifrons* and a live, mostly buried, large *Semicassis granulatum*, found by Judy Bailey. Very large, heavy and knobby *Voluta musica* were also found in the wrack along the shore. This stop wrapped up our shelling on Macanao, except for a brief stop on the southern shore, just west of Guayacamcito, where there is a narrow rocky waterfront and, on this day at least, little to pick through.

(Above) *Turbo castanea* Gmelin, 1791 from off Isla de Coche. (Left) Bill Kreis' 100mm *Voluta musica* Linnaeus, 1758 (Courtesy of Bill Kreis). (Below) Bob Iwamasa's *Clathrodrillia gibbosa* (Courtesy of Bob Iwamasa).

At Laguna de Raya on the southern side of the main portion of Margarita I., is an area of broad tidal flats with intertidal sediments that range from muck near shore, to fine sand offshore. Our visit at this place was timed at the low, receding tide. Glenn found a small rare terebrid, *Terebra angelli*, whose type locality is Margarita I., and two species of marginellas: *P. prunum* and *P. interruptolineata* on past visits. Although this writer did not find the terebra, dead specimens of the marginellas were common. The area is great for bivalves: *Macoma constricta*, *Dosinia concentrica* (not found in Florida but very similar to our *D. elegans*), *Pitar fulminatus*, *Mactrotoma fragilis*, *Periploma margaritaceum*, *Lucina pectinata*, *Protothaca granulata*, and in the beach wrack washed in from further offshore, *Amusium laurenti*. Other gastropods common here include *Oliva fulgurator* (once called *O. scripta*, but now lumped into the senior synonym), *Nassarius vibex* and *Engoniophos unicinctus*. I am sure that with a little more time this area would yield many more species than what we found in the couple hours of shelling.

Our group had a chance to sort through large shell piles dumped by local fisherman at another locale on the southern shore. The fishing village, La Isleta, sits on a narrow peninsula of land that protects a large bay, Laguna des Marites, from the sea. Large piles of *Phyllonotus margaritensis*, *Strombus pugilis*, and *Arca zebra* lie along the bay side of the peninsula, which is behind their homes and across the single dirt access road, dumped here perhaps as fill to stem the encroaching sea. Reportedly, these shells come from fishing grounds off the island to the south, Isla de Coche. While looking for the most perfect specimens of these, other species were encountered: *Chicoreus brevifrons*, *Voluta musica*, *Spondylus americanus*, *Charonia variegata*, *Cymatium femorale*, and *Melongena melongena*, to name a few. The choice of what to keep was difficult so we all lugged back large bagfuls of these fishermen's discards. A little to the east of this village is an area that gives access to the mangrove-lined swamp of Laguna de las Maritas. Here, by a fishing-boat landing between the mangrove trees and a small cantina that serves beer, we searched the mud flats and among the mangrove roots for *Haustellum chrysostomum* and for a longer spined, darker form of *C. brevifrons* than the open water specimens we took at La Isleta. [See the two examples on the title picture]

Typical Margarita bivalves: 1. *Noetia bisulcata* (Lamarck, 1819); 2. *Anadara brasiliana* (Lamarck, 1819); 3. *Carditamera gracilis* Schuttleworth, 1856; 4. *Mulinia* cf. *cleryana* Orbigny, 1847; 5. *Tellina punicea* Born, 1778; 6. *Mactrotoma fragilis* (Gmelin, 1791); 7. *Donax denticulatus* Linnaeus, 1758; 8. *Anomalocardia brasiliana* (Gmelin, 1791); 9. *Pitar dione* (Linnaeus, 1758); 10. *Pitar arestus* Dall & Simpson, 1901; 11. *Tivela mactroides* (Born, 1778)1778); 12. *Protothaca granulata* (Gmelin, 1791); and 13. *Periploma margaritaceum* (Lamarck, 1801)?

Although I had no luck on finding these, *Anomalocardia brasiliana* was common in the muck in the shallows.

La Isleta completes our circuit of the island. South of Margarita lie two small satellite islands, Isla de Coche to the southwest and Isla Cubagua to the southeast. Both islands were explored. After a wild wet ride of some 30 minutes or so in a local fishing boat (open, shallow-draft wooden boat about 24-28 ft in length) we landed at the easternmost end of

***Risomurex gilbertharrisi* from off Isla de Coche.**

Cubagua. Here we snorkeled, beachcombed and sifted through shell piles. The sub-tidal area is a shallow shoal of 2-6 ft, with patches of sand and *Thalassia*. Here, new finds included *Conus mappa trinitarius*, extensive beds of the yellow mussel, *Modiolus americanus*, and live *P. margaritensis*. In shallow pools of sand Shary Almasi took three *Olivella* sp. with a strainer. On the beach, other members of the group found a large *Cassis* ? *madagascarensis*, *C. femorale*, and a nice specimen of *Arcinella arcinella*. In the shell pile, among the pearl oyster *Pinctada imbricata* shells, Bill Kreis found superb and large specimens of *L. nodosa* and more of *C. brevifrons*, the heavy-set open water form.

We snorkeled off the north side of Isla de Coche. Shoals lie a few hundred yards off the northeastern coast of the island and are covered with *Thalassia* with intermittent sandy areas and sparse outcrops of fire coral. The small bright red muricid, *Risomurex gilbertharisi*, was found live on and under dead fire coral. A few (live and dead) specimens of *C. mappa trinitarius*, and numerous multi-colored *Turbo castanea* were found among the coral rubble. Dead *Cymatium krebsii* and the bivalves *Trachycardium isocardia*, *Trachycardium muricatum*, and *Anadara notabilis* were common.

In an altogether different direction off Margarita, off the northeast coast and about one and one-half hours by boat from Juan Griego, are a group of small satellite islands known

as Los Frailes. A few of us joined a charter dive boat to SCUBA dive for shells. We were taken to an area southeast of the easternmost island. This particular spot has both hard coral outcrops and beds of soft corals. We were rewarded with some more great finds (all dead shells) from 30-60 ft of water—a very large (88 mm) *Cymatium nicobaricum*, colorful *Cymatium krebsii*, and again *C. mappa trinitarius*. Some bivalves here were *Barbatia candida*, *Glycymeris undata*, *Glycymeris pectinata*, and *T. isocardia*. On the trip back the crew served us pearl oysters and rum on the half shell (and indeed a few of the oysters had tiny pearls).

While only slightly "warmed" by this refreshing sea fare, the sight of the setting sun was intoxicating, as was the bounty of molluscan diversity offered by the waters around Margarita. Our return trip home was well planed by our leader, and the trip through customs hastened by the aroma in our bags.

For further reading:

Rodriguez (1959). "The Marine Communities of Margarita Island, Venezuela." *Bull. Mar. Sci. Gulf & Carib.* **9**(3):237-280

Richards & Hummelinck (1940). "Land and Freshwater Mollusks from Margarita Island, Venezuela." *Notulae Naturae* No. 62.

(Above) Typical Margarita gastropods: 1. *Fissurella nimbosa* (Linnaeus, 1758); 2. *Tegula viridula* (Gmelin, 1791); 3. *Calliostoma purpureum* Quinn, 1992; 4. *Astralium brevispinum* (Lamarck, 1822); 5. *Turritella variegata* (Linnaeus, 1758); 6. *Persicula interruptolineata* (Mühfeld, 1870); 7. *Prunum storeria* Couthouy, 1837; 8. *Prunum prunum* (Gmelin, 1791); 9. *Strombina pumilo* Reeve, 1859; 10. *Haustellum donmoorei* Bullis, 1964; 11. *Cymatium krebsii* Mörch, 1877; 12. *Eburna tankervillii* (Swainson, 1825); 13. *Conus puncticulatus* Hwass, 1792; and 14. *Conus spurius* Gmelin, 1791. (Left) *Spondylus americanus* from La Isleta shell piles.

Sarasota COA From my Perspective

By **Marsha Darcy**
mdarcy@oberlin.net
Photographs by **Fay Mucha**

Twelve fabulous days of excitement and fun awaited me when I flew from Cleveland to Orlando on July 12th. I was met at the airport by my friend Phyllis Gray, whom I first met three years ago at the Louisville, Kentucky COA convention - my first. Meeting Phyllis, and becoming a member of the Central Florida Shell Club, were two of the best things that could have happened to me. Now I was on my way to my fourth, and, as it turned out, best convention so far!

Phyllis Gray and Marsha Darcy.

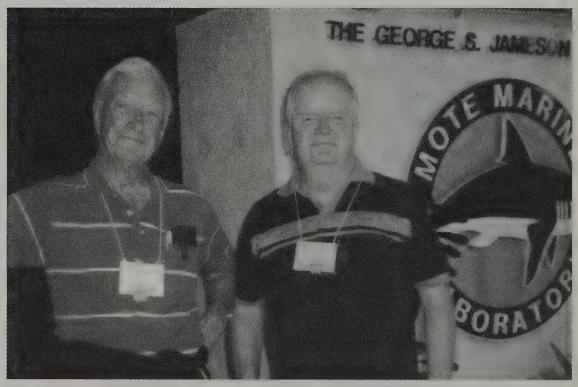
We drove across central Florida the next day, and were very pleased with our room and the convention facilities at the Hyatt on Sarasota Bay. All the hotel personnel, as well as the local host committee members, went out of their way to be friendly and helpful to convention attendees, and the convenience of the meeting rooms made everything very enjoyable.

This year's programs were of exceptionally high quality, the bourse was wonderful, with dealers from all over the country and world, and the social events and field trips associated with the convention were very well planned and executed. Instead of a speaker after the Banquet, we were entertained by the Sarasota Sailors Circus, an impressive group of middle and high school students studying the circus arts.

Another benefit of shell club membership is having a group of friends to sit with at the banquet and join with in all of the various convention activities. This year Phyllis and I enjoyed the company of Dan and Toni Parrish, Jim and Carolyn VunKannon, and Helen Kwiat throughout the week, with other CFSC members coming to Sarasota for the bourse, or other portions of the program. For me, getting to know more COA members each year makes the convention increasingly fun. As a resident of a small town in Ohio, I don't have a local club to belong to, and only know one other serious collector here in Oberlin.

Most of my shells have been purchased from dealers, via mail order. Now that I have experienced a few times at the bourse, I find that mail order is not as satisfying as it once was. I like to actually SEE what I'm getting when I buy it. The COA annual bourse has become my one big shell-buying opportunity of the year, and this year I certainly took full advantage of it. In fact, because I get to see large displays of shells so seldom, I tend to find the bourse overwhelming. After about an hour of shopping, I had to go out to the lobby for a break to calm myself down.

Another special event Phyllis and I attended was the great welcome party at the Mote Aquarium, which has many wonderful exhibits of shells and sea life, including a giant squid named "Molly Mollusk." We also enjoyed field trips to a dinner theater to see "Bye Bye Birdie", and to the Ringling Museum, Ringling Circus Museum, and Ringling Mansion Ca d' Zan.



Trevor Roberts & Tom Rice at the Mote Marine Laboratory.

My favorite field trip, however, was an all-day post-convention bus trip to Sanibel Island. A group of about 30 COA attendees left the Hyatt at 7 a.m., and returned shortly after 8 p.m. Breakfast, lunch, and dinner were included in the trip, AND, as it was a stultifyingly hot and humid day (what else is new in Florida) the organizers brought along eight bottles of cold water per person. I think I drank at least seven of my bottles!

The highlight of the trip for me was our visit to the Bailey-Matthews Shell Museum, with a special tour of the private upstairs offices and storage and work areas provided by Director Jose Leal. Downstairs there was a "hands-on" tank, and I was thrilled to have the opportunity to see AND HOLD live mollusks in their shells for the first time in my life!

An example of Linger Lodge taxidermy - so which one was the road kill?

Other highlights were visits to several shell shops on the island, including Showcase Shells, where many of the shells in my collection came from. And, on the return trip to Sarasota we stopped at the Ramada Inn in Osprey for a wonderful dinner, culminating with a beautifully decorated cake, which said "Until Seattle, Happy Shelling", and was topped with special seashell-shaped chocolate candies courtesy of one of the overseas dealers.

In addition to all the regular COA activities, Phyllis and I drove around in the evenings and visited a number of the area's beautiful beaches. Another first for me was the opportunity to do a little self-collecting of small beach shells one evening on Turtle Beach. I was thrilled, and have the pictures to prove it.

Even though I didn't like the heat and humidity of the days, I admit that the evenings were lovely, with much cooler temperatures and a nice breeze making it possible to walk the beach or the streets of the city in relative comfort. One evening Phyllis and I attempted to drive to Linger Lodge on the Braden River, where we were to meet her sister and brother-in-law for dinner. We did not have good directions and ended up at a place called "Jiggs Landing." Have you seen the movie "Deliverance"? If so, you understand why we got out of there fast, after we found out that it was NOT Linger Lodge.

Linger Lodge itself was a memorable experience. Described as "unique, rustic, and west Florida's Most Unusual RV Resort and Restaurant", it was all of that and more. Good food, and a décor consisting of bad taxidermy (described on the menu as being "mostly roadkill," and it looked it.)

On Friday the 19th, after the conclusion of the Convention, Phyllis and I continued our Florida adventures by driving to Bradenton for a wonderful visit with Phyllis's sister Diane. I saw a Roseate Spoonbill for the first time, and was quite taken with this bird. We also visited a residential neighborhood where peacocks roamed the streets and roosted in the trees at night.

Saturday morning found me feeding toast spread with apple butter to seagulls on a pier, and feeling like I was in the old Alfred Hitchcock movie "The Birds." We were also fortunate to see manatees and dolphins in the wild, but could not locate an alligator.

Saturday afternoon we continued on our way back to Orlando, via the beautiful Bok Tower and gardens in Lake Wales, where we heard a late afternoon carillon concert, and saw gorgeous flowers and trees.

As a final treat of the day, we stopped at club member Ray Wichus's home to drop off some material for the fall club auction. To my delight, Ray invited us in to see his extensive shell collection, and I was most impressed, as well as inspired with new ideas for my own collection.

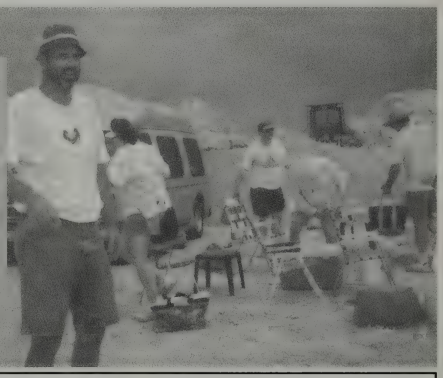
All too soon Monday the 22nd had rolled around and it was time to return to Ohio, via Continental Airlines. On the flight I was surrounded by little boys wearing Mickey Mouse ears (guess where they had been), and a very little girl, who kept pointing to the picture of Mickey Mouse and shrieking "Dog-Dog!" After a number of repetitions of this, I was finally ready to return to Oberlin, where my husband and dog gave me a royal welcome.

PLEASE consider coming to the 2003 COA Convention in Tacoma, Washington. It promises to be an exciting time, with such a different venue with lots of gorgeous Pacific Northwest scenery and wildlife to see, as well as the usual wonderful shells and shellers. I hope to meet you there!

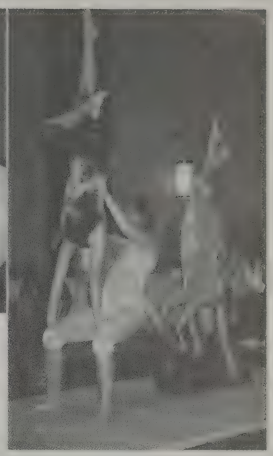
COA SARASOTA

Photographs by Fay Mucha.

(Left) - The squid Kid (Debi Ingrae - our very skilled moderator for the convention) - as for the outfit, you had to be there! (Center) - Anne Joffe as a mermaid for the opening "ceremony." (Right) - Chris Takahashi under attack by Debi's squid.



(Above left) - The real thing, a giant squid preserved at the Mote Marine Laboratory. (Above center) - Jose Leal, Director of the Bailey-Matthews (Sanibel) Museum holds a record sized (fiberglass) *Pleurotomaria.* (Above right) - Digging for fossils in a gravel pit on one of many field trips offered during the convention. (Below left) - Your auctioneers Dick Petit and Hank Chaney. Both shy men who managed to overcome this handicap to auction off shells and related items in support of COA and its many contributions to Conchology. (Below center) - Hank Chaney offers up for bid a rather large "melon" volute. (Below right) - The winning bid is by Linda Brunner who collects her rather large buy!



(Above left) - The Silent Auction gets a thorough going over by bargain hunters. (Above center) - past president Betty Lipe welcomes newly elected president Tom Grace to his new duties as head of COA. (Above right) - Some of the young performers from the Sarasota Sailor's Circus demonstrate their skills during the annual banquet.

(Left, clockwise from upper left) - A few of the dealers at the bourse: Rich Goldberg with an impressive variety of landshells, Karl Stanley with a basket full of *Pleurotomaria*, Richard Sharpe with a variety from the Philippines, Dr. Thach (Vietnamese shells) and Donald Dan (worldwide specimens), Simone and Hugh Morrison with Australian and Pacific shells, & Brian Hayes with South African shells.

(Below, left to right) - Lynn Scheu says goodby to over a decade and a half as editor of American Conchologist. She received the only standing ovation of the convention. Tom Rice invites everyone to Tacoma, Washington for COA Covention 2003. Two gals smiling because it is all over - Debi Ingrae and Peggy Williams.

Mike Sawchuk 8/2002

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American CONCHOLOGIST

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Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

Volume 30, No. 4 December 2002

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors – to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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Editor's Notes

This being my second issue, I figured it was safe to appear in print with a few comments concerning American Conchologist. First I owe a heart-felt thanks to Lynn Scheu for handing over a first class publication. She took a black and white, Xeroxed newsletter and turned it into a well-respected, international, color magazine. Lynn has given a lot to COA, but surely her most visible and certainly her most time consuming contribution is the American Conchologist magazine. Thank you Lynn.

Next is a thank you for the many contributors past and present who provide the material that keeps this a quality publication. So far both issues have involved serious cutting to be able to fit in all of the material I received. The up side of this is an issue full of interesting articles. The down side is an empty folder for the next issue. Hopefully the material will continue to show up in time for each succeeding issue.

Speaking of thanks and future issues, I have to sadly announce the departure of our magazine ad manager, Lori Schroeder. Lori deserves tremendous thanks for her work as ad manager and for staying on an additional six months to help out in the transition from the professional editorship of Lynn - to the work of this new, rank amateur. Lori works tirelessly to ensure our advertisers are properly represented and keeps the more business end of the operation well organized. Sadly, we have had no one yet step in to fill her position. Alas, my list of personal characteristics does not include great organizational skills. In fact, I lost this list somewhere on my desk beneath papers, shells, books, and maybe growing and evolving organisms new to science. Yes, this is a job announcement. I really do need someone willing to work with dealers and other advertisers on the business end of this operation. Anyone interested please contact me at thomas@Rt66.com.

I have handed out a few well-deserved thanks and pleaded for help – not much left but to plug the COA convention for 2003. Make plans now to attend the festivities in Tacoma, Washington on Puget Sound. The formal dates for the convention are 17 to 21 July, but I know Tom Rice and members of the Pacific Northwest Shell Club have set up additional activities both before and after the convention dates. The Seattle – Tacoma area is truly a wonderful part of the US with scenery that varies from seashore to deep woods to the almost unbelievable Mt Rainier. This looks to be a memorable convention – see you there.

Tom Eichhorst

Front Cover: A colorful assortment of Icelandic pectens (*Chlamys islandica* (Müller, 1776) photographed by Dan Karmeli for the article on Islandic seashells by Moshe Erlendur Okon on page 24.

Back Cover: Jim Miller (known to most of you for his past article and photographic contributions) created our back cover by morphing a photograh of a *Harpa harpa* Linnaeus, 1758 into a rather spectacular piece of art.

Fasciolaria Species (Tulip Shells) of the Pliocene to Recent of Southern Florida

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Introduction: The tulips are a popular group of smooth to lightly sculpted, medium-sized fasciolariine buccinoid gastropods that include two abundant species in near-shore or shallow water and four closely related offshore, deeper water forms off Florida and the Gulf of Mexico. There are also 11 named extinct fossil forms of *Fasciolaria* from southern Florida, which I will place in a historical geologic framework and a phylogenetic tree. Like the *Busycon* species I have previously analyzed (Aigen, 2000) these are variable taxa, sometimes exhibiting greater intraspecific than interspecific variation, sometimes forming distinct local colonies which may merge at the edges. In order to best express the relationships within the evolving lineages, I use only two subgeneric and five specific names. I reduce five of the named forms to subspecific level and seven to synonyms, with infrasubspecific (varietal) status. I use these taxa to best document the evolution of the groups. Varietal names help depict the wide range of morphology that most of the species exhibit.

The genus *Fasciolaria* Lamarck, 1799, is a Western Atlantic, Miocene to Recent group, with *F. tulipa* (Linnaeus, 1758) as the type. Similar forms in South Africa and elsewhere, which evolved independently, should not be included in this genus. Note that earlier common usage included species now variously placed in *Triplofusus*, *Pleuroploca*, and *Terebraspira*. *Fasciolaria* is divided into two subgenera. Members of the nominotypical subgenus have subsutural grooves and often other spiral lirae on the body whorl. This subgenus is represented in Florida by an evolving lineage of a late Pliocene species, including a named, broader variety, succeeded by a variable, broad to narrow, early Pleistocene subspecies of the late Pleistocene to the Recent *F. tulipa*. The Mio-Pliocene *F. semistriata* (Sowerby 1850) from the Dominican Republic and its probable descendant, the southern Caribbean Pleistocene to Recent species *F. hollisteri* Weisbord, 1962, are not treated herein.

The subgenus *Cinctura* Hollister, 1957, is characterized by a subsutural parietal ridge inside the aperture. These smooth-shelled forms include the Recent, generally short, inflated, shallow-water *F. lilium hunteria* G. Perry, 1811 and its elongate, offshore variety *F. tortugana* Hollister, 1957. There are three Gulf of Mexico forms, increasingly elongate with water depth, which represent an evolutionary lineage evolved from the late Pliocene *F. l. apicina* Dall, 1890, common in Florida. A similar distribution of nearshore and offshore forms occurs as evolving lineages of variable morphology throughout the Plio-Pleistocene of Southern Florida. (See fig.1.) None of the fossils was living in water deeper than occurs off west Florida today.

There are two other fossil *Fasciolaria (Cinctura)* species from areas further north than those treated here. *F. rucksorum* Petuch, 1994 and *F. beaufortensis* Ward and Blackwelder, 1987; both may be varieties of *F. rhomboidea* Rogers and Rogers, 1839, but were not studied in detail.

Small, broad *Fasciolaria* forms from shallow water, apparently varieties of larger elongate forms from deeper water, appear to be a general pattern throughout the geologic record, including the Recent *Fasciolaria* species. This change in form with water depth may correspond to food source, water perturbation, or predation. A short shell, with the center of gravity close to the aperture, may give the snail an advantage in holding course in turbulent waters. It may also help in flipping itself away from a predator, such as a larger *Fasciolaria*. This inflated shape becomes less important as the snail grows larger, as they do in deeper water, or as the snail-eating predators become fewer. Predators generally substitute worms for clams and snails as prey in deep-water sediments (Wells, 1970). Tulips broad, unspecialized diet is consistent with the few species living at any time. Competition also causes little local overlap of the two subgenera, both in fossil and Recent forms.

The deeper water forms were more likely to survive both the rapid drop in sea level and in temperature, that separated the periods of deposition (formations) than were the shallow-water forms. Offshore forms are not restricted to a narrow fringe of shallow water that moves rapidly down-slope as the sea recedes. They tolerate a larger range of depths, are less exposed to rapid changes in water temperature, and thus have more time to adapt. These forms would more likely survive to reinvade the new inland seas, generally with slight modification, forming new subspecies and/or varieties.

Stratigraphy and ages of rocks of southern Florida—Pliocene to Recent: The geologic history of southern Florida helps to put this taxonomic pattern into perspective. For the last 2.4 million years (see fig.1, page 22) the land was inundated by the sea at least 5 times. The formations we use to describe the layers (strata) of loose or cemented mixtures of sand, clay, lime and shells represent those intervals when global sea level was high, water was warm, and the area was submerged. Formations are separated by periods of ice build-up causing low sea level, generally with erosion of existing strata, sometimes with land or fresh water deposits.

Many fossils and rock units are now known only from dredged, possibly mixed material ('float'). Therefore, although I agree with Scott (1992) and Petuch (1994) that the old formation names are not technically correct, I don't feel that we are yet ready to properly, formally update the stratigraphy, and, like Portell et al. (1995), I will retain the old system here.

The age of the Pinecrest Beds (at Sarasota and elsewhere) has been generally accepted as late Pliocene (see fig.1). The overlying Caloosahatchee Formation was long thought to also be Pliocene (e.g. Olsson and Harbison, 1953) but some controversial mammalian and absolute age dating showed that at least some of the Caloosahatchee was Pleistocene in age (as in Scott, 1992). The most recent studies, using a combination of different dating techniques and refined boundary definitions (Morgan and Hulbert, 1995 and Portell et al, 1995) place the Plio-Pleistocene boundary between the Caloosahatchee and the overlying lower Pleistocene Bermont Formation. Above this is the late Pleistocene Ft. Thompson Formation. Lyons (1991) gives a thorough summary of these and other formation names.

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Framework of the evolution of *Fasciolaria*: During the Pliocene and Pleistocene, the surface of southern Florida was often underwater and diverse environmentally, with islands, beaches, sand flats, 'grass' flats, coral reefs and relatively deep troughs, but with an overall basin shape (summarized in Petuch, 1994). Sediments accumulating on the sea floor gradually decreased the overall water depth during this period so the average depth was less during the deposition of the Caloosahatchee than during the Pinecrest, further decreasing during the Bermont and Fort Thompson Formations.

While the current land area of Florida was submerged under 'inland seas', there were also 'offshore' areas around the flooded basin. These

(Continued on page 19)

An Amazon Rain Forest Shelling Adventure

by José Coltro Jr

During a visit some years ago to our National Museum in Rio de Janeiro, I was talking with Dr.Norma Salgado, the head of the Malacological Department and she told me they had found some very interesting fauna in Serra do Navio, State of Amapá – in the extreme north of Brazil. Amapá is almost completely covered by the Amazon Rain Forest and is very scarcely populated. It is truly equatorial as the equator crosses through Macapá, the state capital. It is also extremely warm and humid. The state has one of the largest manganese fields in the world and one of the most interesting human projects: the Jari Project.

In 1946 geologists found the largest manganese field ever discovered and during the next 50 years the mine produced up to 1.6 million tons of manganese per year. One entire mountain disappeared. Production stopped 6 years ago but there is another entire mountain of manganese waiting to be explored. To produce the mineral the mining company built a small town that is still well preserved today.

The Jari Project was the dream of an American, Daniel K. Ludwig. He bought 1.2 million hectares of virgin Amazon Rain Forest. His idea was to create the largest rice field and cellulose production plant in the world. He engineered a fantastic project with towns of 20,000 people, an electric plant, and miles of good roads (a rarity in this area). He spent $750 million (US)! He began the project in 1953, but conquering the Amazon jungle eventually proved impossible and he gave up the project in 1980's. The Brazilian government and some outside investors purchased the land and associated improvements. To date it has still not shown a profit.

Because of these two projects, the State of Amapá has electricity, good roads, and is well served by land and water transportation. When I decided to go to Amapá, I had some information about land and freshwater mollusks from my helper Alex Bodart. He went there a month before I did and found some nice material. I went to Pará to try to get some shells from local shrimp boats and I decided to fly to Macapá. I booked a very small plane – I could have flown in a normal jet, but by using a small airplane I had the opportunity to see the fantastic forest and the hundreds of islands in the mouth of the Amazon River.

Arriving in Macapá I rented a car to drive to Serra do Navio. The other option was the train, but I wanted the flexibility of traveling by car. As soon as Alex and I left Macapá we took a very good road surrounded by 120km of man-made forest of eucalyptus and pines! I did not see a single native tree along this entire road! But, just after the good road ended and the "off-road" started, the wonderful Amazon forest appeared – full of incredible trees, rivers, animals, plants, etc. We left Macapá around 2:00pm and encountered the "real" forest about two hours later. I was worried about the road situation; in this part of the world there are only two seasons, the rainy season and the rainier season! But we had a pleasant surprise, they had "fixed" the road and it wasn't too bad. We arrived in Serra do Navio around 7:00pm. It took three hours to drive another 120 km, not because of the bad road, but because we stopped so many times to sightsee.

Serra do Navio is a nice little town, full of quaint, small houses. The only problem was where to stay. The local hotel had closed most of its facilities, but after talking to the hotel manager we were provided with a nice room with air-conditioning – an added benefit I later found useless. Serra in Portuguese means hills, and the town is 650 meters above sea level. The temperature during the night was extremely pleasant and we had some fog. The next morning the rain started and we went to see the manganese mine.

Although it is officially an abandoned mine there are still caretakers. We got permission from them and procured a local guide to accompany us. The guide took us to see the mountain of manganese ready to be shipped that has sat abandoned for the last six years. The Amazon forest is slowly coming back and a nice secondary forest is covering some of the more devastated areas. They also kept some virgin forest and it was here I had my first contact with the real Amazon Rain Forest.

I was initially very nervous about walking through the forest because I knew it contained spiders, a part of nature I do not appreciate. However, I was in for a nice surprise. In four hours of walking in the forest I didn't see a single spider web! In fact, I didn't get a single insect bite or skin irritation – both common problems in dense jungle forests. But best of all, I found some very nice land shells!

1. *Aperostoma agassizi* Torre, Bartsch & Morrison, 1942 - 20mm; **2.** *Aperostoma pulchellum* Torre, Bartsch & Morrison, 1942 - 20mm; **3.** *Aperostoma redfieldi* Torre, Bartsch & Morrison, 1942 - 20mm; **4.** *Psadara rosaria* (Pfeiffer, 1849) - 23mm; **5.** *Corona perversa* (Swainson, 1820) - 63mm; **6.** *Corona perversa* (Swainson, 1820) - 63mm; **7.** *Drymaeus lusorius* (Pfeiffer, 1854) - 23mm; **8.** *Euglandina striatula* Vernhout, 1914 - 25mm; **9.** *Euglandina surinamensis* Vernhout, 1914 - 48mm; **10.** *Orthalicus bensoni* (Reeve, 1849) - 46mm; **11.** *Labyrinthus bifurcata* (Deshayes, 1838) - 32mm; **12.** *Labyrinthus leprieurii* (Petit, 1840) - 20mm; **13.** *Sultana sultana cayanensis* (Beck, 1837) - 60mm; **14.** *Solaropsis pellisserpentis* (Chemnitz, 1795) - 54mm

Brazilian apple snails, approximately life sized. 1. *Pomacea canaliculata dorbignyana* (Philippi, 1851) - 50mm; 2. *Pomacea nigrilabris* Philippi, 1851 - 50mm; 3. *Pomacea nobilis* (Reeve, 1858) - 75mm; 4. *Pomacea urceus erythrostoma* Reeve, 1856 - 32mm; 5. *Pomacea urceus guianensis* (Lamarck, 1819) - 64mm.

My first shell was a nice *Labyrinthus leprieurii* (Petit, 1884), along side the road. I watched very closely, always afraid to find something else (with eight hairy legs), and I found some more nice land snail specimens. Walking up the hill I found other *Labyrinthus*, including, *L.bifurcata* (Deshayes, 1834) and a very nice surprise, a single *Sultana sultana cayanensis* (Beck, 1837). During the afternoon I went to the river near the town. It was rainy season (of course) and the river was quite high. I couldn't see the waterfalls that are in that area, but I did find some nice *Asolene nubila* (Reeve, 1856) and large *Pomacea nigrilabris* Philippi, 1851.

The weather was often rather unpleasant, but when the sun appeared I found a huge beetle - *Megasoma actaeon*, the heaviest beetle in the world. Suddenly there were more than a dozen specimens around the beach huts. The largest measured more than 12 centimeters! Walking along the riverside I saw millions of ornamental fishes, turtles, and lots of birds. In the forest, most trees (some quite large) were full of orchids and bromeliads. Nature here was really generous.

Alex and some locals went deep in the forest and they brought back superb sinistral *Corona perversa* (Swainson, 1821) and the most beautiful *Solaropsis pellisserpentis* (Chemnitz, 1795). They also found one extremely rare *Psadara rosaria* (Pfeiffer, 1849), a few Poteriidae and some more Ampullariidae.

While preparing the various shells for the trip back home I put the beetles in a large foam box. The largest specimen, a male, promptly opened the lid! I put some heavy stuff over the top but this very strong beetle again forced open the top of the box! I then put the beetle in a plastic box thoroughly secured with tape. My intention was to bring all the beetles back alive to friends in our Zoological Museum. By now, the

other beetles started to make holes in their foam box, so I put them all in separate plastic boxes secured with tape. All of these boxes were then packed in my hand-carried luggage.

We left Serra do Navio in the middle of the afternoon and the weather was atypically clear. On the way back I saw many large snakes crossing the road, beautiful large birds, and monkey-like mammals. The trip back was fantastic, smooth driving with lots to see. Arriving in Macapá we went directly to the hotel, left our luggage and went to have a good dinner. This was our chance to test the local cuisine; Amazonian fish and shrimp with local herbs, some of them with unique and interesting tastes. When we came back to the hotel we had a big surprise. My large beetle had opened the plastic box, tunneled through my clothes, out of the suitcase, and was crawling on the bed! I caught the beetle, put it back in the plastic box, taped it up again, repacked it among my clothes, and zipped up the luggage. Two hours later while I was sleeping I heard a strange noise. I turned on the light and you guessed it, the large beetle had opened the box, tunneled through my clothes again and out of the luggage! This last time I used a roll of tape to secure the plastic box.

Jose's escape artist beetle, *Megasoma acteon* (Linnaeus). Held by a local resident (below) and on a table at the residence (above).

Arriving in Belem, I had few hours before my connection to São Paulo and I decided to visit the famous local market, called Ver-o-Peso. It is a wonderfully colorful place full of exotic items and odors. There you may find many Amazonian products like fresh fish, fruits, seeds, herbs, shrimps, etc. I looked for some palm trees to bring back to my friend Andre Weber and I found more than 20 different species! I arrived in São Paulo and despite worrying about the beetles, they were still secure. They are now living in a terrarium at our local museum.

My trip left me with wondrous feelings about the marvels of the Amazon Rain Forest. I am happy to report that the Brazilian Government is now protecting over 35% of the area as National Parks. I hope my kids can go there one day and see how the forest can be!

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Jordan Star's Web Picks

★= poor, ★★= fair, ★★★= good, ★★★★= excellent, ★★★★★= outstanding.

To continue with my favorites (bookmarks), links are not in any particular order:

★★★ Shell Screen Savers, http://molluscs.net/screensavers/. Three different screen savers from a Conch-L member. I use one, very nice.

★★ Alternative Photography, XRAY Seashell Photos, http://www.crowncity.com/shellfish/. A few pictures, mostly a commercial site. Can buy photos.

★★★★ Sea Shells — Sea Shell City, http://www.seashellcity.com/. Lots of links and information, nice music on home page with a home decoration section. Many pictures, can buy shells for a collection.

★★ Yahooligans! - Science and Nature: Living Things: Animals: Invertebrates: Molluscs, http://www.yahooligans.com/Science_and_Nature/Living_Things/Animals/Invertebrates/Mollusks/Mollusk_Pictures/. Some pictures and links. The home page might be good for kids.

★★★★ Sanibel Island Florida. A complete insiders guide to Sanibel Island, http://www.sanibelflorida.com/. A great site for shellers and travelers. A big help in identifying local shells. Many pictures and links to aid in the experience of Sanibel Island. Don't forget to visit the museum. (Links good/work as of 12-4-02)

Columellar folds - why are they there?

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Columellar folds are the ridges on the inner lip of many snail shells (Figure 1). They are most striking in the volutes and miters, but appear in many other families and have evolved at least eight times in sea shells, in addition to evolving in terrestrial shells. Alexander Suvorov, working in Russia, has shown that the columellar folds in land snails may help separate different strands of muscle. Unfortunately, we still don't know why columellar folds evolved in sea shells. The earliest explanation is Dall's (1894) idea that folds evolved from an overly large mantle crammed into the shell. If the mantle, which secretes the shell, were wrinkled, folds would grow within the wrinkles. Dall used this hypothesis to explain why other types of internal ornamentation, like the parietal ridge and lirae on the outer lip, evolved. One problem with this idea, however, is that there are no obvious differences in the mantle sizes of species with and without internal ornamentation.

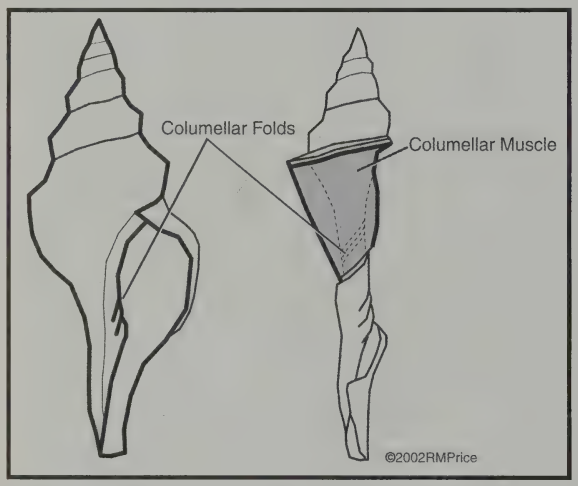

Figure 1. Columellar folds and the columellar muscle in *Triplofusus giganteus* (FMNH299441).

As part of my dissertation research, which has been generously supported by COA, I tested three additional hypotheses that explain the existence of folds. All these hypotheses pertain to the columellar muscle, which attaches the snail to its shell:

1. Columellar folds guide the columellar muscle as the animal moves in and out of its shell, essentially acting as a railroad track guiding a train, preventing the animal from slipping in its shell (Signor and Kat, 1984). This hypothesis predicts there will be more contact between the columella and the columellar muscle of species with folds. To test it, I dissected a series of species with and without folds to compare their surface area of contact.
2. Columellar folds enhance a snail's ability to maneuver its shell (Vermeij 1978; Fretter and Graham 1962: 57-8). Perhaps animals with folds can maneuver their shells better because, if the muscle attaches to the shell over the folds, the surface area of attachment would be greater. I measured the total surface area of attachment in species with and without folds.
3. Columellar folds enhance a snail's ability to escape predation by allowing the animal to retract deeper into its shell. Dall (1894) commented that snails with folds retract deeper into their shell, making it harder for a predator to reach its prey. I used the initial attachment location as a proxy for retraction depth, again comparing species with and without folds.

I took measurements from 30 specimens in 7 species with folds and 5 species without, and supplemented these data with descriptions on an additional 9 species (Table I). Specimens were collected from both coasts of Florida and Panama, and funding for collecting trips was provided by COA. All specimens are now stored at the Field Museum of Natural History (FMNH).

In order to examine the muscle attachment to the columella, I used a

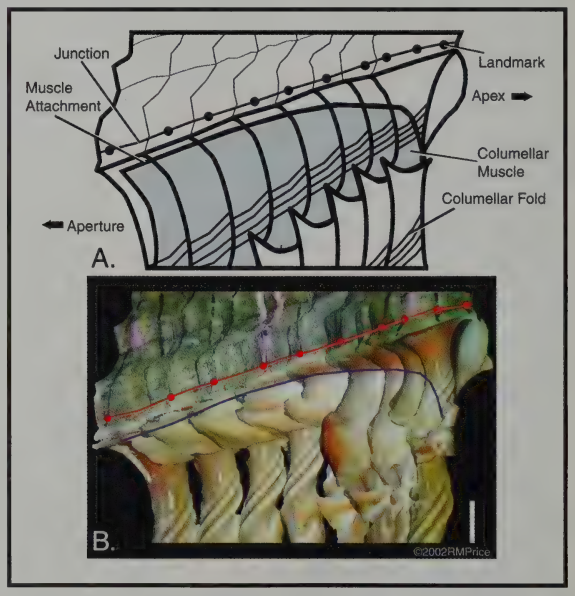

Figure 2. A series of photographs of *Triplofusus giganteus* (FMNH299441) depicting columellar muscle attachment morphology (in blue), spliced together by aligning the attachments, creating a single image that looks like an uncoiled, flattened shell. The attachment begins at the top of the whorl and gradually slides down the columella. Towards the end of muscle, the angle of attachment changes dramatically and crosses the folds. Much of the muscle has been removed to expose columellar folds, but remains intact in two of the views, illustrating that the area of contact extends from the attachment to the bottom of the columella. The scale bar is 1 cm. The landmarks, which indicate location on the shell, are in red. The orange line is the junction between two whorls.

Table 1: Species Examined

Species with folds	Species without folds
Busycon contrarium (Conrad, 1840)[1]	*Chicoreus florifer distans* (Adams, 1855)[1]
Busycon spiratum (Lamarck, 1816)[1]	*Cypraea cervus* (Linné, 1771)
Cantharus cancellarius (Conrad, 1846)[1]	*Melongena corona* (Gmelin, 1791)[1]
Columbella rusticoides Heilprin, 1886	*Oliva sayana* Ravenel, 1834[2]
Fasciolaria hunteria (Perry, 1811)[1]	*Polystira nobilis* (Hinds, 1843)
Fasciolaria tulipa (Linné, 1758)[1]	*Stramonita haemastoma* (Linné, 1767)[1]
Leucozonia nassa (Gmelin, 1791)	*Strombus alatus* Gmelin, 1791[1]
Nassarius vibex (Say, 1822)[1]	*Urosalpinx perrugata* (Conrad, 1846)[1]
Opeatostoma pseudodon (Burrow, 1815)	
Pleuroploca salmo (Wood, 1928)	
Terebra dislocata (Say, 1822)	
Triplofusus giganteus (Kiener, 1840)[1]	
Vasum muricatum (von Born, 1778)	

[1]Used in quantitative analysis. [2]Measured attachment depth only.

Dremel rotary tool to cut away the outside of the shell. This approach kept the organs and columella intact. Each dissection was documented with a series of photographs, from which I could measure the total surface area of contact between the columella and muscle, the total attachment area, and the initial point of attachment. But there was still one problem that needed to be overcome: a picture is actually a 2D distortion of 3D data (think of a map projection of the world), so I needed to develop a way to reconstruct the 3D data from the photos. This reconstruction is possible, though, because a shell is a stack of circles of varying widths, all centered about the same line.

Interestingly, there is no statistical difference between species with and without folds with respect to the amount of muscle in contact with the columella or the surface area of muscle attachment, suggesting that columellar folds don't guide the columellar muscle, nor do they enhance maneuverability. Even more surprising, species with folds attach more shallowly in their shells than species without folds; it is easier for a predator to reach species with folds. This last result might well be an artifact of my sample; high-spired species, for example those in the genus *Terebra*, may well attach more deeply than any of the species considered here.

One surprising result to come out of this study is the nature of the columellar muscle attachment. Previously, the attachment was assumed to be circular, like that in clams, and situated right in the center of the columella. However, its shape is far more complex (Figure 2). In species both with and without folds, the initial part of the attachment is located immediately under the junction between two whorls, and then it gradually moves down the columella until it reaches a point at which the angle of attachment changes dramatically, and moves quickly across the rest of the columella.

These data cast doubt on the accepted hypotheses that explain why columellar folds exist. However, there are additional ideas that are worth considering: why are folds more common in tropical species (Vermeij, 1978)? Do burrowing species tend to have columellar folds (Signor, 1982)? Do columellar folds make the shell stronger, and therefore more resistant to a crushing predator like a crab?

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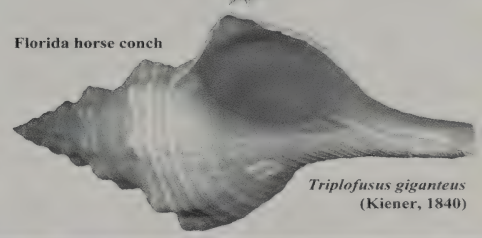

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SEP02

Report on molluscan species found in the offshore waters of Louisiana, including many extensions of known range and un-named species.

E. F. García and H. G. Lee

This report deals with mollusks collected in waters of the Louisiana coast from 1970 to the present. Early collecting resulted in only a few species obtained principally by SCUBA diving on the offshore calcareous banks or "pinnacles" (García, 1974). However, beginning in 1993, the use of the "Pelican," a research vessel belonging to the Louisiana Universities Marine Consortium, produced many more species (García, 1999, 2000, 2001). A large percentage of these taxa were not known to inhabit the northwestern Gulf of Mexico, of these, some had never been reported from anywhere in the Gulf, and still others, mainly micro-mollusks, seem to be undescribed species.

Due to the effects of the Mississippi, Atchafalaya, and Calcasieu Rivers, the Louisiana coastal areas consist mainly of marshland and beaches composed of mud or muddy sand. This type of rather uniform shoreline habitat is inimical to molluscan diversity. In contrast, offshore habitats are more diverse. Besides the prevalent muddy bottom, the many offshore oil-rig platforms act as artificial reefs, making it possible for epifaunal bivalves of the families Arcidae, Ostreidae, Chamidae, and Spondylidae to prosper, and with them, the predators *Stramonita haemastoma* and *Hexaplex fulvescens*. Hydrocarbon vents on the continental slope off the Louisiana coast have also created an ecosystem with an interesting molluscan fauna (see Carney, 1994 and Warén & Bouchet, 1993). However, the most diverse of the offshore habitats is the series of calcareous banks that arise abruptly from the deep, soft, muddy sediment to approximately 20 to 90m from the surface. These are inhabited by a rich molluscan fauna. Parker et al. (1956) have recorded some 130 such banks off the Texas and Louisiana coasts. These banks, particularly those off Louisiana, are essentially calcareous islands in a sea of mud, and their molluscan species are quite different from the surrounding soft bottom.

The species in this list were collected from approximately 20m to 555m; from latitude 27.48° N to 28.37° N, and from longitude 88.59°W to 93.18° W. They were obtained by SCUBA diving, trawling, dredging, and with core grabs in mud, silty sand, calcareous rubble and hydrocarbon vents. The sediment obtained from such collecting methods was passed first through a 1/4" mesh and then through a 1/16" mesh to preserve the smaller species. Of the 385 species-level taxa listed, 108 are reported as new records for the northwestern Gulf of Mexico and comprise approximately 28% of the total. Each of these is marked with an asterisk. Many of the species have never been reported from the continental United States.

Voucher specimens for all listed species are in the García and/or Lee collections. This list can be viewed at http://www.jaxshells.org/efg1030.htm. Taxonomic updates, as well as images of the more pertinent species, will be added to the list as it becomes necessary and as time permits.

Molluscs found in the offshore waters of Louisiana, including many extensions of known ranges and un-named taxa:

1. *Nucula aegeensis* Jeffreys, 1879
2. *Nuculana acuta* (Conrad, 1831)
3. *Nuculana carpenteri* (Dall, 1881)
4. *Nuculana concentrica* (Say, 1824)
5. *Nuculana verrilliana* (Dall, 1886)
6. *Nuculana vitrea cerata* authors, (non Dall, 1881)
7. *Yoldia solenoides* Dall, 1881
8. *Amygdalum papyrium* (Conrad, 1846)
9. *Botula fusca* (Gmelin, 1791)
10. *Crenella divaricata* (d'Orbigny, 1845)
11. *Crenella* cf. *fragilis* A. E. Verrill, 1885
12. *Gregariella chenui* (Récluz, 1842)
13. *Anadara baughmani* Hertlein, 1951
14. *Anadara notabilis* (Röding, 1798)
15. *Anadara transversa* (Say, 1822)
16. *Arca zebra* (Swainson, 1833)
17. *Barbatia cancellaria* (Lamarck, 1819)
18. *Barbatia domingensis* (Lamarck, 1819)
19. *Fugleria tenera* (C. B. Adams, 1845)
20. *Arcopsis adamsi* (Dall, 1886) "form" *conradiana* (Dall, 1886)
21. *Noetia ponderosa* (Say, 1822)
22. *Tucetona pectinata* (Gmelin, 1791)
23. **Cratis antillensis* (Dall, 1881)
24. *Pteria colymbus* (Rsding, 1798)
25. *Pinna carnea* Gmelin, 1791
26. *Ctenoides floridanus* (Olsson and Harbison, 1953)
27. *Limaria locklini* (McGinty, 1955)
28. *Limatula hendersoni* Olsson and McGinty, 1955
29. *Limatula setifera* Dall, 1886
30. *Limatula* species 856 of Redfern, 2001
31. *Limea bronniana* Dall, 1886
32. *Amusium papyraceum* (Gabb, 1873)
33. *Euvola raveneli* (Dall, 1896)
34. **Pecten chazaliei* Dautzenberg, 1900
35. *Lindapecten muscosus* (Wood, 1828)
36. **Palliolum reticulum* (Dall, 1886)
37. *Spathochlamys benedicti* (A. E. Verrill and Bush, 1897)
38. *Cyclopecten nanus* (A. E. Verrill and Bush, 1897)
39. *Plicatula gibbosa* Lamarck, 1801
40. *Spondylus americanus* Hermann, 1781
41. *Spondylus ictericus* Reeve, 1856
42. *Ostreola equestris* (Say, 1834)
43. *Lucina sombrerensis* Dall, 1886
44. *Lucinoma atlantis* R. A. McLean, 1936
45. *Lucinoma filosa* (Stimpson, 1851)
46. **Lucinoma* species
47. *Diplodonta notata* Dall and Simpson, 1901
48. *Chama lactuca* Dall, 1886
49. *Chama macerophylla* Gmelin, 1791
50. *Pseudochama radians* (Lamarck, 1819)
51. *Glans dominguensis* (d'Orbigny, 1842)
52. *Pleuromeris armilla* (Dall, 1903)
53. *Pleuromeris tridentata* (Say, 1826)
54. *Crassinella lunulata* Dall, 1886
55. *Crassinella martinicensis* (d'Orbigny, 1846)
56. *Americardia media* (Linnaeus, 1758)
57. *Nemocardium* (*Microcardium*) *tinctum* (Dall, 1881)
58. *Papyridea soleniformis* (Bruguière, 1789)
59. *Trachycardium magnum* (Linnaeus, 1758)
60. *Trachycardium muricatum* (Linnaeus, 1758)
61. *Ensis megistus* Pilsbry and McGinty, 1943
62. *Macoma pulleyi* F. M. Bayer, 1969
63. *Tellina aequistriata* Say, 1824
64. *Tellina iris* Say, 1822
65. *Tellina squamifera* Deshayes, 1855
66. *Tellina sybaritica* Dall, 1881
67. *Abra lioica* (Dall, 1881)
68. *Semele bellastriata* (Conrad, 1837)
69. *Semele proficua* (Pulteney, 1799)
70. *Semele purpurascens* (Gmelin, 1791)
71. **Neolepton* species [apparently un-named]
72. *Callista eucymata* (Dall, 1890)
73. *Circomphalus strigillatus* (Dall, 1902)
74. *Dosinia elegans* Conrad, 1846
75. **Globivenus listeroides* (Fischer-Piette and Testud, 1967)
76. *Globivenus rigida* (Dillwyn, 1817)
77. *Gouldia cerina* (C. B. Adams, 1845)
78. *Lirophora clenchi* (Pulley, 1952)
79. *Mercenaria campechiensis* (Gmelin, 1791)
80. *Pitar cordatus* (Schwengel, 1951)

81. *Pitar fulminatus* (Menke, 1828)
82. *Puberella intapurpurea* (Conrad, 1849)
83. *Timoclea grus* (Holmes, 1858)
84. *Corbula barrattiana* C. B. Adams, 1852
85. *Corbula caribaea* (d'Orbigny, 1842)
86. *Corbula dietziana* C. B. Adams, 1852
87. *Varicorbula disparilis* (d'Orbigny, 1842)
88. *Pandora arenosa* Conrad, 1834
89. *Poromya rostrata* Rehder, 1943
90. *Cardiomya perrostrata* (Dall, 1881)
91. *Plectodon granulatus* (Dall, 1881)
92. *Antalis antillarum* (d'Orbigny, 1842)
93. *Dentalium americanum* Chenu, 1843
94. *Dentalium laqueatum* A. E. Verrill, 1885
95. *Laevidentalium* species
96. *Playschides* cf. *arctus* (Henderson, 1920)
97. *Platischydes bushii* (Dall, 1889)
98. *Platischydes pandionis* (Dall, 1889)
99. **Patelloida* cf. *pustulata* (Helbling 1779) [much weaker radials; sharp, crowded concentrics; straighter-sided; less irregular in outline]
100. *Perotrochus amabilis* (F. M. Bayer, 1963)
101. *Haliotis poutalesii* Dall, 1881
102. *Diodora cayenensis* (Lamarck, 1822)
103. *Diodora fluviana* (Dall, 1889)
104. *Diodora sayi* (Dall, 1889)
105. *Emarginula phrixodes* Dall, 1927
106. **Emarginula pumila* (A. Adams, 1852)
107. *Emarginula sicula* J. E. Gray, 1825
108. *Emarginula tuberculosa* Libassi, 1859
109. **Hemitoma emarginata* (de Blainville, 1825)
110. **Laevinesta atlantica* Pérez Farfante, 1947
111. **Lucapina adspersa* Philippi, 1845
112. *Lucapina aegis* (Reeve, 1850)
113. *Rimula aequisculpta* Dall, 1927
114. *Zeidora bigelowi* Pérez Farfante, 1947
115. *Arene bairdii* (Dall, 1889)
116. **Arene venustula* Aguayo and Rehder, 1936
117. *Astralium phoebium* (Rsding, 1798)
118. *Cantrainea macleani* Warén & Bouchet, 1993
119. **Turbo cailletii* P. Fischer and Bernardi, 1856
120. *Turbo castanea* Gmelin, 1791
121. *Cataegis meroglypta* J. McLean, 1987
122. **Lamellotrochus* species [uncharacteristically narrow, unadorned umbilicus]
123. **Mirachelus corbis* (Dall, 1889)
124. **Calliostoma* sp. aff. *benedicti* Dall, 1889 [juv. but different]
125. *Calliostoma euglyptum* (A. Adams, 1854)
126. *Calliostoma roseolum* Dall, 1881
127. **Calliostoma sapidum* Dall, 1881
128. *Calliostoma scalenum* Quinn, 1992
129. *Alaba incerta* (d'Orbigny, 1842)
130. *Litiopa melanostoma* Rang, 1829
131. *Cerithium litteratum* (Born, 1778)
132. *Cerithidea costata* (da Costa, 1778)
133. *Fossarus compactus* Dall, 1889
134. *Turritella acropora* Dall, 1889
135. *Turritella exoleta* (Linnaeus, 1758)
136. *Turritella* cf. *exoleta* (Linnaeus, 1758) [wider spire angle]
137. **Tenagodus modestus* (Dall, 1881)
138. *Tenagodus squamatus* (de Blainville, 1827)
139. **Folinia motezzi* (Bavay, 1917)
140. *Rissoina decussata* (Montagu, 1806)
141. *Rissoina princeps* (C. B. Adams, 1850)
142. **Rissoina vanderspoeli* de Jong and Coomans, 1988
143. *Phosinella fenestrata* (Schwartz, 1860)
144. *Phosinella sagraiana* (d'Orbigny, 1842)
145. *Zebina browniana* (d'Orbigny, 1842)
146. *Zebinella elegantissima* (d'Orbigny, 1842)
147. *Sansonia tuberculata* (Watson, 1886)
148. **Teinostoma cocolitoris* Pilsbry and McGinty, 1945
149. *Teinostoma cryptospira* (A. E. Verrill, 1884)
150. *Teinostoma megastoma* (C. B. Adams, 1850)
151. **Vitrinorbis* cf. *callistus* (Pilsbry and Olsson, 1945) [a Panamic taxon]
152. *Caecum cooperi* S. Smith, 1860
153. *Caecum plicatum* Carpenter, 1858
154. *Caecum ryssotitum* de Folin, 1867
155. *Cheilea equestris* (Linnaeus, 1758)
156. *Capulus incurvus* (Gmelin, 1791)
157. *Xenophora conchyliophora* (Born, 1780)
158. **Petaloconchus erectus* (Dall, 1888)
159. *Erosaria acicularis* (Gmelin, 1791)
160. *Talparia cinerea* (Gmelin, 1791)
161. **Cyphoma mcgintyi* Pilsbry, 1939
162. *Pseudosimnia vanhyningi* (M. Smith, 1940)
163. *Simnialena uniplicata* (G. B. Sowerby II, 1848)
164. *Hespererato maugeriae* (J. E. Gray, 1832)
165. **Niveria antillarum* (F. Schilder, 1922)
166. *Niveria candidula* (Gaskoin, 1836)
167. *Niveria suffusa* (J. E. Gray, 1827)
168. *Pusula maltbeana* (Schwengel & McGinty, 1942)
169. *Naticarius canrena* (Linnaeus, 1758)
170. *Natica marochiensis* (Gmelin, 1791)
171. *Natica menkeana castrensis* Dall, 1889
172. *Polinices lacteus* (Guilding, 1834)
173. *Sinum minus* (Dall, 1886)
174. *Oocorys bartschi* Rehder, 1943
175. *Sconsia striata* (Lamarck, 1816)
176. *Charonia tritonis variegata* (Lamarck, 1816)
177. **Cymatium occidentale* Clench & Turner, 1957
178. *Cymatium labiosum* (Wood, 1828)
179. *Distorsio mcgintyi* Emerson & Puffer, 1953
180. *Bursa granularis* Rsding, 1798
181. *Bursa rhodostoma thomae* (d'Orbigny, 1842)
182. *Atlanta peronii* Lesueur, 1817
183. *Cerithiopsis albovittata* (C. B. Adams, 1850)
184. *Cerithiopsis flava* (C. B. Adams, 1850)
185. *Cerithiopsis fusiformis* (C. B. Adams, 1850)
186. *Cerithiopsis* cf. *ophiura* Olsson and Harbison, 1953
187. **Cerithiopsis warmkae* de Jong and Coomans, 1988
188. *Cerithiopsis* species C (Lee ms.)
189. *Cerithiopsis* species D (Lee ms)
190. *Horologica pupa* (Dall and Simpson, 1901)
191. *Retilaskeya* species [no protoconch]
192. *Seila adamsi* (H. C. Lea, 1845)
193. **Cosmotriphora arnoldoi* Faber & Moolenbeck, 1991
194. *Cosmotriphora melanura* (C. B. Adams, 1850)
195. *Inella longissima* (Dall, 1881)
196. *Inella* cf. *triserialis* (Dall, 1881)
197. *Inoforis turristhomae* (Holten, 1802)
198. **Mesophora novem* (Nowell-Usticke, 1969)
199. **Metaxia espinosai* Rolán & Fernández-Garces
200. **Metaxia excelsa* Faber and Moolenbeek, 1991
201. *Metaxia rugulosa* (C. B. Adams, 1850)
202. **Monophorus ornatus* authors (non Deshayes, 1832)
203. *Nototriphora decorata* (C. B. Adams, 1850)
204. *Similophora intermedia* (C. B. Adams, 1850)
205. **"Triphora" dupliniana* Olsson, 1916
206. **"Triphora" elvirae* de Jong and Coomans, 1988
207. *"Triphora" lilacina* Abbott, 1974 (non Dall, 1889)
208. **"Triphora" oreodoxa* Olsson and Harbison, 1953
209. **"Triphora"* species 1[Also N.E. Florida]
210. **"Triphora"* species 2 [utterly distinct from anything seen from the W. Atlantic. The middle (2 of 3) spiral row of beads appears at the beginning of the teleoconch, being larger than, and closer to, the first (adpical) than the third (abapical) spiral until the last whorl.]
211. *Amaea mitchelli* (Dall, 1896)
212. *Amaea retifera* (Dall, 1889)
213. **Eccliseogyra formosissima* (Jeffreys, 1884)
214. *Epitonium championi* Clench & Turner, 1952
215. *Epitonium echinaticostum* (d'Orbigny, 1842)
216. *Epitonium foliaceicostum* (d'Orbigny, 1842)
217. *Epitonium krebsii* (Mørch, 1874)
218. *Epitonium novangliae* (Couthouy, 1838)

219. *Epitonium polacium* Dall, 1889
220. *Epitonium rupicola* (Kurtz, 1860)
221. *Opalia pumilio* (M¿rch, 1874)
222. *Eulima auricincta* (Abbott, 1958)
223. *Eulima bifasciata* d'Orbigny, 1842
224. *Eulima* sp. aff. *fulvocincta* C. B. Adams, 1850 [nearly identical to E. fulvocincta, but the proto and early teleoconch are massive]
225. *Melanella gibba* sensu Abbott, 1974, non de Folin, 1867
226. *Melanella hypsela* (A. E. Verrill and Bush, 1900)
227. *Niso aeglees* Bush, 1885
228. **Niso hendersoni* Bartsch, 1953
229. *Vitreolina arcuata* (C. B. Adams, 1850)
230. *Vitreolina* sp. (cf. Redfern no. 362)
231. *Chicoreus florifer* (Reeve, 1846)
232. *Chicoreus consuela* (A. H. Verrill, 1950)
233. *Favartia cellulosa* (Conrad, 1846)
234. *Hexaplex fulvescens* (G. B. Sowerby II, 1834)
235. *Murexiella levicula* (Dall, 1889)
236. *Stramonita haemastoma floridana* (Conrad, 1837)
237. *Trachypollia turricula* (von Maltzan, 1884)
238. *Typhinellus sowerbii* (Broderip, 1833)
239. **Vokesimurex anniae* (M. Smith, 1940)
240. **Babelomurex dalli* (Emerson and D'Attilio, 1963)
241. *Babelomurex mansfieldi* (McGinty, 1940)
242. *Coralliophila aberrans* (C. B. Adams, 1850)
243. *Coralliophila caribaea* Abbott, 1958
244. **Hirtomurex* cf. *longicauda* (Settepassi, 1971)
245. **Mohnia* species
246. **Antillophos elegans* (Guppy, 1866)
247. *Cantharus cancellarius* (Conrad, 1846)
248. **Engina* cf. *corinnae* Crovo, 1971
249. *Nassarius hotessieri* authors (non d'Orbigny, 1842) [*Nassarius* species 17 in Lee, 1998, American Conchologist]
250. **Nassarius* species 10 Lee, 1998
251. *Nassarius acutus* (Say, 1822)
252. *Fusinus couei* (Petit de la Saussaye, 1853)
253. *Latirus infundibulum* (Gmelin, 1791)
254. *Triplofusus giganteus* (Kiener, 1840)
255. *Astyris lunata* (Say, 1826)
256. *Cosmioconcha calliglypta* (Dall and Simpson, 1901)
257. *Nassarina glypta* (Bush, 1885)
258. *Parvanachis obesa* (C. B. Adams, 1845)
259. *Suturoglypta iontha* (Ravenel, 1861)
260. *Scaphella junonia* (Lamarck, 1804)
261. *Oliva sayana* Ravenel, 1834
262. **Olivella* cf. *adelae* Olsson, 1956
263. *Olivella pusilla* Marrat, 1871
264. *Olivella watermani* McGinty, 1940
265. *Morum dennisoni* (Reeve, 1842)
266. **Granulina* cf. *ovuliformis* (d'Orbigny, 1842) [never seen before]
267. *Dentimargo* cf. *aureocinctus* (Stearns, 1872) [may be just a depauperate morph]
268. *Prunum avenaceum* authors (non Deshayes, 1844)
269. **Volvarina* species [cannot ID]
270. **Mitra antillensis* Dall, 1889
271. *Mitra nodulosa* (Gmelin, 1791)
272. **Mitra straminea* A. Adams, 1853
273. **Vexillum epiphaneum* (Rehder, 1943)
274. **Vexillum hendersoni* (Dall, 1927)
275. **Vexillum pulchellum* (Reeve, 1844)
276. *Vexillum sykesi* (Melvill, 1925)
277. *Axelella smithii* (Dall, 1888)
278. *Terebra concava* (Say, 1826)
279. *Terebra dislocata* (Say, 1822)
280. **Terebra glossema* Schwengel, 1942
281. **Terebra mugridgeae* García, 1999
282. *Terebra protexta* Conrad, 1845
283. *Terebra vinosa* Dall, 1889
284. *Conus armiger* Rehder & Abbott, 1951
285. *Conus atractus* Tomlin, 1937
286. *Conus ermineus* Born, 1778
287. **Conus mindanus* Hwass in Bruguière, 1792
288. **Conus mus* Hwass in Bruguière, 1792
289. **Conus patae* Abbott, 1971
290. **Conus riosi* Petuch, 1986
291. **Conus stimpsoni* Dall, 1902
292. *Agathotoma candidissima* (C. B. Adams, 1845)
293. **Agathotoma coxi* Fargo in Olsson & Harbison, 1953
294. *Bactrocythara* cf. *asarca* (Dall and Simpson, 1901) [more axials and more extensive spirals]
295. *Bellaspira* species [I have it from off Panama City, FL also]
296. *Brachycythara* cf. *multicinctata* Rolán and Espinosa, 1999
297. **Cerodrillia bealiana* Schwengel and McGinty, 1942
298. **Drillia* (*Lioglyphostoma*) *canna* (Dall, 1889)
299. **Drillia* (*Lioglyphostoma*) species A of Lee
300. **Drillia* (*Lioglyphostoma*) species C of Lee
301. *Drillia* (*Neodrillia*) *cydia* (Bartsch, 1943)
302. *Daphnella corbicula* Dall, 1889
303. **Daphnella* sp. aff. *corbicula* Dall, 1889
304. **Daphnella reticulosa* Dall, 1889
305. **Glyphostoma epicasta* Bartsch, 1934
306. *Glyphostoma gabbii* Dall, 1889
307. **Glyphoturris eritima* (Bush, 1885)
308. *Glyphoturris quadrata* (Reeve, 1845)
309. *Glyphoturris rigirima* (Dall, 1889)
310. *Ithycythara lanceolata* (C. B. Adams, 1850)
311. *Ithycythara psila* (Bush, 1885)
312. *Ithycythara* cf. *psila* (Bush, 1885) [spiral cords and weaker peripheral nodes]
313. *Kurtziella margaritifera* Fargo in Olsson and Harbison, 1953
314. *Kurtziella serga* (Dall, 1881)
315. *Lissodrillia* cf. *simpsoni* (Dall, 1887)
316. *Microdrillia comatropis* (Dall, 1881)
317. *Mitrolumna biplicata* Dall, 1889
318. *Nannodiella oxia* (Bush, 1885)
319. *Nannodiella vespuciana* (d'Orbigny, 1842)
320. *Polystira tellea* (Dall, 1889)
321. *Pyrgospira ostrearum* (Stearns, 1872) [?+ *Pyrgospira tampaensis* (Bartsch and Rehder, 1939)]
322. *Rimosodaphnella morra* (Dall, 1881)
323. *Rubellatoma rubella* (Kurtz & Stimpson, 1851)
324. **Splendrillia halidorema* (Schwengel, 1940)
325. **Splendrillia pagodula* (Dall, 1889)
326. **Stenodrillia* species
327. *Tenaturris inepta* (E. A. Smith, 1884)
328. **Vitricythara lavalleeana* (d'Orbigny, 1842)
329. **Mathilda agria* (Dall, 1889)
330. **Mathilda barbadensis* Dall
331. **Mathida* cf. *hendersoni* Dall, 1927 [has regular axials terminating on prominent nodules along principal spiral cord]
332. **Mathilda vanaartseni* de Jong and Coomans, 1988
333. **Discotectonica discus* (Philippi, 1844)
334. *Heliacus bisulcatus* (d'Orbigny, 1842)
335. *Psilaxis krebsii* (Mörch, 1875)
336. **Adelacteon* species
337. *Chrysallida nioba* (Dall & Bartsch, 1911)
338. **Chrysallida* species
339. **Chrysallida* (*Foliniella*) species [apparently unnamed]
340. *Eulimastoma didymum* (A. E. Verrill and Bush, 1900)
341. **Eulimella* cf. *unifasciata* (Forbes, 1843)
342. *Eulimella unifasciata* (Forbes, 1843)
343. *Fargoa dianthophila* (H. W. Wells and M. J. Wells, 1961)
344. *Longchaeus crenulatus* (Holmes, 1859)
345. **Odostomia acutidens* Dall, 1884
346. **Puposyrnola* species
347. *Tryptychus niveus* Mörch, 1875
348. **Triptychus* species (23393; sta D-1)
349. *Turbonilla* (*Chemnitzia*) *aequalis* sensu Harry, 1984 (non Say, 1826)
350. *Turbonilla* (*Chemnitzia*) *abrupta* Bush, 1899
351. **Turbonilla* (*Chemnitzia*) cf. *coomansi* Van Aartsen, 1994
352. *Turbonilla* (*Chemnitzia*) *hemphilli* Bush, 1899
353. **Turbonilla* (*Chemnitzia*) *levis* (C. B. Adams, 1850)
354. **Turbonilla* (*Chemnitzia*) species 1 [more rugged and conical than *T. hemphilli*; this is species E of H. G. Lee ms]
355. **Turbonilla* (*Chemnitzia*) species 2 [large, ivory white, channeled sutures; axials have posterior overhang]
356. *Turbonilla* (*Odostomella*) cf. *doliolum* (Philippi, 1844) [This is the larger, paler,

spirally-banded morph discussed by Odé, 1993 Texas Conch 29 (3): species 479, not 480 (which is *Turbonilla fonteini* de Jong and Coomans, 1988); also Bermuda (HGL Collection).]
357. **Turbonilla* (*Pyrgiscus*) cf. *asperula* Bush, 1899 [T. (P.) species A; H. G. Lee ms]
358. *Turbonilla* (*Pyrgiscus*) *incisa* Bush, 1899
359. **Turbonilla* (*Pyrgiscus*) *portoricensis* Dall and Simpson, 1901
360. **Turbonilla* (*Pyrgiscus*) *pupoides* (d'Orbigny, 1842)
361. **Turbonilla* (*Pyrgiscus*) *virga* Dall, 1884
362. **Turbonilla* (*Pyrgiscus*) *viridaria* Dall, 1884 [+ *T. conradi* Bush, 1899; close to *T.* (*P.*) species 2 and 4]
363. **Turbonilla* cf. *riisei* (Mørch, 1875) [apparently unnamed]
364. **Turbonilla* (*Pyrgiscus*) species 1 [fluted axials; also from Alabama and Dry Tortugas; an offshore species]
365. **Turbonilla* (*Pyrgiscus*) species 2 [larger protoconch, sharper axials than *T.* (*P.*) *incisa* Bush, 1899)]
366. **Turbonilla* (*Pyrgiscus*) species 3 [this is *Turbonilla* species H of Redfern; no. 621]
367. **Turbonilla* (*Pyrgiscus*) species 4 [convex whorls, strong spirals, plentiful axials]
368. **Turbonilla* (*Pyrgiscus*) species 5 [slender, straight-sided; finer, more numerous spirals than *T.* (*P.*) species 6]
369. **Turbonilla* (*Pyrgiscus*) species 6 [slender, straight-sided; fewer spirals than **T.* (*P.*) species 5]
370. **Turbonilla* (*Strioturbonilla*) species 1 [conical, broad mid-whorl spiral groove; smaller protoconch than *T.* (*S.*) sp. C Lee ms]
371. *Turbonilla (*Strioturbonilla*) species 2 [elongate, slowly -expanding]
372. **Turbonilla* (*Strioturbonilla*) species 3 [like *T.* (*S.*) species 1 but whorls more slender, elongate, and straight-sided]
373. **Acteon* species
374. *Acteocina bidentata* (d'Orbigny, 1842)
375. *Acteocina candei* (d'Orbigny, 1842)
376. **Volvulella minuta* (Bush, 1885) [This is *Bulla recta* Mörch, 1875, which is unavailable (*lapsus calami* for *Bulla acuta* d'Orbigny)]
377. *Volvulella paupercula* (Watson, 1883)
378. *Volvulella texasiana* Harry, 1967
379. **Atys caribaeus* (d'Orbigny, 1842) [This is "*Atys riiseana* [sic] Mörch, 1875" in Abbott, 1974]
380. **Atys mandrewii* E. A. Smith, 1872 [the figure of "*Atys sandersoni* Dall, 1881" (no. 4099) in Abbott (1974) is this species, not *A. sandersoni*]
381. *Haminoea* species [too worn for ID]
382. *Cavolinia longirostris* de Blainville, 1821
383. *Cavolinia uncinata* (Rang, 1829)
384. *Diacria trispinosa* (de Blainville, 1821)
385. *Williamia krebsii* (Mörch, 1877)

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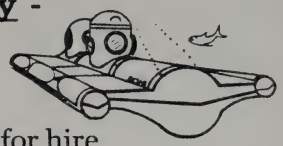

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JAPANESE MALACOLOGISTS OF THE 20TH CENTURY NO. 1. TETSUAKI KIRA (1888 – 1965) BY IWAO TAKI.

Translated with notes by **Paul Callomon**

Introduction: This is the first in an occasional series of obituaries of senior 20th century Japanese malacologists. They are translated from the original Japanese with the aim of providing a glimpse of the story behind some names that are familiar from shell books and papers. Many shell collectors and scientists are familiar with Tetsuaki Kira's 1954 book *Coloured Illustrations of the Shells of Japan*. Few outside Japan know much more about him than that, however, and almost none of his work in Japanese has been translated. Kira played a pivotal role in the post-war revival of malacology in Japan and is a splendid example of the constructive role the talented amateur can play in the advance of science. The following is an abridged version of the first of no fewer than six detailed tributes to Kira that appeared in Venus volume 24 (4) in 1966. The others were also by senior figures of the time, including Tajima Kanamaru, Tadashige Habe, Tokubei Kuroda and Masuo Horikoshi. These names give some idea of Kira's standing among his contemporaries.

Tetsuaki Kira (1888-1965)

Translator's notes: Curved brackets are original; square parentheses and all footnotes are added here. Dates are as in the Japanese original, with their Western equivalents.

Acknowledgements: Thanks are due to Mr. R. E. Petit for the loan of volumes of *Yume-hamaguri* and to Ms Sayuri Yoshii for help with the finer points of older Japanese style.

Kira Tetsuaki-sensei tsuito no ki **[Mourning Tetsuaki Kira]**
By Iwao Taki - Venus 24(4): 273-276

Tetsuaki Kira finally departed this world on April 17th, Showa 40 [1965]. Kira was the head priest of a prestigious temple in Shijonowate in Kita-kawauchi district, Osaka Prefecture. He went on to work in Osaka City, first as an elementary school teacher and later as headmaster, retiring in Showa 21 [1946]. From childhood on, he had a deep interest in nature and particularly in mollusks. For example, on one occasion he collected both the Kawaneji-gai *Camptoceras hirasei* Walker and Hidarimaki-monoara-gai *Camptoceras (Culmenella) prashadi* Clench. He reported his finds to Yoichiro Hirase. This was a notable discovery, as it represented the extreme northern distribution limit, so Hirase arranged for the specimens to be sent to America. Both were described as new, with the scientific names mentioned above, but it seems that at the time little attention was paid to the identity of the collector. Moreover, his home address was incorrectly cited as the locality for both species ('Koga village in Kita-kawauchi district', later renamed Shijonowate). This can be attributed to Kira's having neglected to tell Hirase the details of the collecting locality. As Kira himself later stated (Venus 11 (2-3): 97-98, 1941), the actual locality was Matta village in Kita-kawauchi district, and an erroneous type locality was thus cited.

Both before and after the war, Kira gained great honor in the world of children's education, becoming the head of the Shijonowate Board of Education upon his retirement. Throughout the same period, he was enthusiastically collecting and studying mollusks. The tenth anniversary meeting of the Malacological Society of Japan was held in October of Showa 13 [1938] at the Akagawa Elementary School in Osaka Prefecture, where Kira was headmaster. Splendid shells from his collection were displayed.

Kira moved to Kyoto shortly before the outbreak of war. In those days, meetings occasionally took place among the enthusiasts of the Keihanshin area[1]. Those held at the home of Ryosuke Kawamura at Ashiya in Hyogo Prefecture were called the 'Ashiya-kai' (Venus 11 (2-3): 112-114, 1941), but later ones were called 'Tengu-kai'[2] or 'Mokuhachi-kai'[3]. The study of mollusks continued to develop with each year, even during the war. The meetings continued after the war in the Ikka-in [hall] of Tofuku temple in the Higashiyama ward of Kyoto City, but a number of members were experiencing serious hardships following Japan's defeat.

When I saw him the other day, Kira was still affected by the loss of his wife; that aside, though, he lived a blessed existence compared with the average person. At the end of the war, he resolved to provide by himself a medium for communication among shell enthusiasts. This was something that they desired above all, but which would be very hard to bring into being. He began on the 5th of April Showa 21 (1946) with the *Mokuhachi-tengu-kai Jiho*[4] (six parts), which was mimeographed and distributed free to about fifty friends and acquaintances. From the third number (June 5th), the title changed to *Kairui Kenkyu Yume-hamaguri*[5]. On June 6th Showa 23 (1948), a sixtieth birthday celebration was held in Kyoto for '*Tengu Anshu*' [Master Tengu], and a celebratory issue appeared, complete with a portrait. The monthly magazine soon began to attract manuscripts from Kira's many friends. Tipped-in pictures, plates, appendices and indexes were added, and this enthusiasts' newsletter began to take on the character of a serious scientific journal[6].

Yume-hamaguri ran from volume one (Showa 22, 1946: issues 1-12) to volume twelve (Showa 34, 1959; issues 91-100). For a short period in Showa 33 (1948) Kira was convalescing from illness, so issues 92 to 94 (116 pages) were produced by a professional mimeograph writer, via the good offices of Mr Kanamaru and Mr Abe. Excluding this, there were a total of 3,428 pages (not counting covers, plates, appendices and indexes), and the following stand-alone works or supplements also appeared:

Tetsuaki Kira: *Nihon-san Kai-sei Kai-rui Mokuroku* [Catalog of Marine Mollusca of Japan]
(Handwritten facsimile) Yoichiro Hirase: *Futsu Kai-rui no Shiori* [Guide to Common Mollusks]
(Handwritten facsimile) Hirase Conchological Museum: *Sen-kai Mokuroku* [Catalog of a Thousand Shells]
Tokubei Kuroda: *Nihon-san Tansui Kai-rui Mokuroku* [Catalog of the freshwater Mollusca of Japan]
Tokubei Kuroda: *Nihon-san Rikusei Kai-rui Mokuroku* [Catalog of the terrestrial Mollusca of Japan]
Wenz (translated by Katsura Oyama): *Fuku-soku-so* [Gastropoda] (Complete work on Paleontology)
Tadashige Habe: *Nimai-gai Zoku-shu Zuko* [Illustrated Study of the Bivalvia]

Kira's Catalog of Marine Mollusca contained records of all the species of shell-bearing mollusk (Gastropoda, Scaphopoda and Bivalvia) known to him, each with its scientific name, Japanese name and localities. A notable feature was that depths were also given. As with the others, if this work had been typeset and properly printed it would have been of very great value. At the time there was almost no chance of obtaining the necessary financing, so even had the manuscript been thus prepared it would simply have languished. The great significance of this work lies in that it was created entirely by Kira's own hand.

As is well known, Kuroda's two catalogs of freshwater and terrestrial mollusks were issued as a combined volume by the Malacological Society of Japan to celebrate his 77th birthday in Showa 38 (1963). All these works became indispensable treasures of great usefulness that were to be found at the right hand of shell enthusiasts; but their very nature meant that though demand persisted, they could not be offered again. To be able to produce such works in the times of general hardship following the war, it goes without saying that there had to be hidden benefactors. Hikoezaemon Kubota of Masue in Fukui Prefecture provided the fresh, unused paper from former military stocks. Ryosuke Kawamura obtained the mimeograph stencils and other supplies from Tottori, and the cord used to bind each issue was made by Tajima Kanamaru. This is a good opportunity to express deep gratitude to these gentlemen.

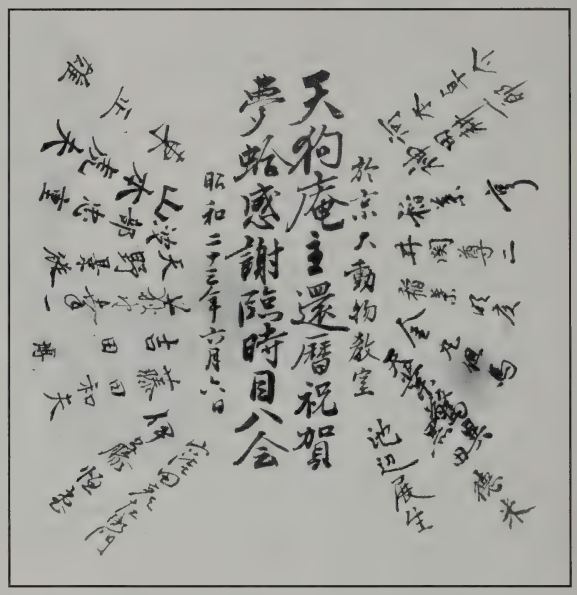
The above works contained an enormous number of pages, but that they all appeared thanks to Kira's tireless efforts was largely unknown. Not surprisingly, he used to recall how his right hand would finally stiffen up and the stylus would wear out. Far more impressive, however, was that he edited, printed and distributed all these various works on his own for thirteen years with no special recognition for his efforts. It was a superhuman feat that perhaps no other person could have accomplished. During this period shell enthusiasts were blessed in being able to study and have an interest, and in thus being able to rise above the post-war vacuum and fully enjoy each passing year.

The rapid inflation of the time kept the *Venus* in a critical condition. Its publication continued throughout, but the resources were lacking to even accept many malacological manuscripts. Of course, many other scientific journals were in the same state, and these problems were certainly not unique to the *Venus*, but for the *Yume-hamaguri* to step in and shoulder the majority of the burden was an achievement of great significance deserving a special place in the annals of Japanese malacology[7].

Besides those he found himself, Kira's rich collection[8] included specimens gained by exchange with friends and acquaintances from many regions and as gifts from Akibumi Teramachi and others. Even after the war, Kira continued to travel to Kochi Prefecture, Tanegashima and elsewhere in search of rare specimens.

Kira published a series of studies in the *Yume-hamaguri* entitled *Kairui Ikei no Kenkyu* [On morphological variation in mollusks], in which he showed that with careful study, a number of species that had previously been vaguely lumped together could actually be told apart. This important work dealt with, among many others, the Atsuiso-shijimi *Nuttallina solida* Kira and the Hime-chosen-fude *Mitra sp.* Such questions cannot often be answered simply by studying the external characters of the shell, however, and in many cases it is advisable also to compare the animal's internal anatomy and investigate its ecology and life modes. For these reasons, certain cases defied Kira's solo efforts and a final decision was left to future workers. He nevertheless named a considerable number of species, and many others were named after him in both Latin and Japanese.

It was the book *Genshoku Nihon Kairui Zukan* [Coloured Illustrations of the Shells of Japan], the first printing of which was published by Hoikusha on September 5th, Showa 29 (1954) that made Kira a well-known name both in Japan and all over the world. This was a color compendium featuring roughly 1200 common species. Shintaro Hirase's color encyclopedia of shells appeared some years before, but Kira's book featured text entries for each species and larger, more brightly colored figures that reflected the latest advances in printing technology. It was a most fitting work for its time, and vigorous demand meant that the number of reprints soon began to rise. To date (August, Showa 40) [1966] it has been enlarged and revised and is in its tenth printing[9]. An English version has also appeared, which is encouragingly proving of use overseas.



Autograph Circle - a congratulatory card from Kira's 60th birthday celebration held in the Department of Zoology at Kyoto University on June 6th, 1958 by the 'Mokuhachi Committee for appreciation of the Yume-Hamaguri'. Signatures include those of Tokubei Kuroda, Tadashige Habe, Hikozaemon Kubota, Torao Yamamoto, Masao Azuma and Tajima Kanamaru.

The only problem with this work is that a number of the species contained within it bear scientific names that had been provisionally assigned and circulated among acquaintances by, among others, Professors Kuroda, Habe and Oyama. These names were used in Kira's book without the appropriate notation, and although their authors were cited, the priority rules of the ICZN state that the appearance of a figure and an explanation – even in Japanese – means that these species are deemed described by Kira himself. This was something about which Kira naturally had no inkling, but it led to the false notion that he had usurped the work of other researchers. According to one source, production of the series of which this book is a part (and in which there have so far been 42 'color encyclopedias' alone) was planned in secrecy and in great haste, and sufficient time was thus not allowed to circulate the manuscript among colleagues for review. Had Kira known in advance that such a situation would result, he would doubtless have managed to do something about it. He later explained the circumstances and published an apology in the *Yume-hamaguri*; however, once work of this nature is published it cannot be retracted, and scientific names created by various others are thus all now attributed to 'Kira'.

In the troubled times following the war, Kira was active in various schemes as a member of the Malacological Society of Japan,

and this is something else for which we must show deep appreciation. He was an enthusiastic participant at every annual meeting held in the Kinki region[10] and at those in Tokyo, too. We will never forget him expounding his views for the benefit of the other members. Kira was absent due to illness for some time in Showa 33 [1958], but with proper convalescence he recovered and we once more encountered his warm smile. However, last year (1965) he attended his final Malacological Society annual meeting in Osaka, and thereafter he no longer appeared in public. He regrettably passed away last April. A short time before, on receiving news that Kira was seriously ill, the Society had held an emergency meeting and elected him Member Emeritus in recognition of his life's contributions. He was presented with an award (a silver dish inscribed with the crest of the Society) at his bedside, and his joy at this was to be our sole consolation.

As many people know, Kira's son Tatsuo was sent abroad to study and became an authority on Botany. He is now a professor at Osaka Municipal University, and a fine credit to his father.

(Footnotes)

[1] The area encompassing the cities of Kyoto, Osaka and Kobe.

[2] 'Tengu' was Kira's nickname. Tengu is a figure from Japanese folklore with a red face and long, curved nose. He is a vigorous iconoclast with rough manners and a somewhat vulgar nature.

[3] 'Mokuhachi' is a word that frequently appears in Japanese molluscan literature. It is a reference to the 1843 book 'Mokuhachi-fu' by Sekiju Musashi, an early illustrated work in which many of today's Japanese vernacular shell names made their first appearance.

[4] 'Reports of the Mokuhachi-Tengu club'.

[5] *Yume-hamaguri* is the Japanese name for the bivalve *Callanaitis hiraseana* Kuroda, 1930. Shell names have been chosen for the titles of many Japanese malacological journals, including the *Chiribotan*, *Hitachiobi*, *Yuriyagai* and of course the *Venus* itself. The change to the new title apparently did not occur from the third number, but from the sixth.

[6] Regular contributors included Tokubei Kuroda, Tadashige Habe, Takashi Okutani, Isao Taki, Katsura Oyama and Masao Azuma.

[7] A full collation in English of the 100 issues of the *Yume-hamaguri* is currently being undertaken. The stencils were hand-written, which means that the hundreds of new names introduced in its pages are all *nomen nuda*. Many were validated in later publications.

[8] Now housed in the Osaka City Museum of Natural History in Nagai Park, Osaka.

[9] The myriad new names, errors and other points of note that appeared in the original and numerous subsequent printings of this work were collated and analyzed by R. E. Petit and R. Bieler (Malacologia **32** [1]: 131-145, 1990; 38 [1-2]: 33-34, 1996)

[10] The area of central Japan encompassing Kyoto, Osaka, Nara, eastern Hyogo and northern Wakayama Prefectures.

In Memorium

Catherine (Rosie) Adams (Chiloquin, OR)
Ruby Drake (Enid, OK)
Irene Leonard (Winston-Salem, NC)

(*Fasciolaria* - Tulip shells, continued from page 3.)

areas are still offshore and not represented in the known fossil record of present day Florida. There were often major connections between the inland seas over present-day Florida and the offshore seas allowing free movement of mollusks from offshore to inshore areas and back. As the sea level dropped, these connections pinched out, isolating some areas as inland seas or bays. As the sea level rose again, small populations, often evolving into distinctive new forms, invaded the new seas, spreading out quickly in the newly submerged areas where there was a minimum of competition. This happens through such mechanisms as 'founder effect,' where a new population starts with a small number of individuals of unusual form, and 'genetic drift,' which allows rapid change in a small population where conditions are not stable. (See Wilson, 1992 for a good overview of speciation processes.)

The most important factor in the Plio-Pleistocene extinctions in southern Florida was lowering of water temperature accompanying intensified glaciation (Stanley, 1986, 1987). This, together with the resulting drop in sea level, caused great stress on populations, the extinction of species and the evolution of new forms in the time between formations.

This is not the only scenario accounting for the changes in populations. Migration of species from colder or warmer water, as temperatures of the sea changed, also caused faunal changes. The drop in sea level sometimes left isolated, stressed populations that showed change in form from their antecedents. In addition, new varieties evolved from the existing forms during times of relatively stable sea level to exploit new environments within the varied sea. Some of these new varieties never had a chance to separate measurably from the parent form and remained 'incipient' species until their extinction (Tursch, Greifeneder, and Huart, 1998.)

Evolution of new species does not happen slowly and continuously. Most marine species lived for millions of years essentially morphologically unchanged (homeostasis), at least as far as the fossil record can document, and are the same from the top to the bottom of a formation. There is often a similar species in the formation below and a third similar species in the formation above. A few cases (e.g. Williamson, 1981) have documented the relatively small area (the size of a lake) and time (approximately 5,000 years) in which new species have evolved, one from the other. This relatively rapid burst of evolution (speciation) interrupted by long periods of homeostasis was termed punctuated equilibrium (Eldredge and Gould, 1972) and is the general rule throughout the geological record for most groups of organisms. However, Campbell, 1993 noted that strict homeostasis was not the rule for a number of Pliocene mollusks, which exhibit great variability within a broad population. He termed this variability heterostasis. Note, however, that these genetic variants have a beginning and end in the fossil record. Change is not continuous, but may form a radiation (a 'complex') of new forms or may consist of a series of small steps, each overlapping the last one and lasting only a short time (an 'evolving lineage' of Hargreave, 1995) or distance (a clinal gradation). If a population has a significant number of members that are not distinguishable from members of another population, they must be considered to be the same species, even when extreme forms of both populations are distinguishable. If we had living organisms, this would apply to the whole organism, not just the shells. The shells could be identical, but in two separate species, distinguishable through biochemical or other 'soft part' tests.

Plasticity of forms within a species—either due to genetically distinct 'races' or to the interaction of the genes and the environment (ecophenotypes)—is well documented in a number of recent species (Wilson, 1992), and seems to be the case for the *Fasciolaria* lineages as well. An understanding of the entire population is critical to understanding the variation. Campbell used a broad, population based understanding of species in his 1993 monograph of the Virginia Pliocene mollusks to facilitate broad stratigraphic correlations. Petuch, in contrast, uses a more typological approach in his many publications (visually summarized in his 1994 'Atlas'), emphasizing small stratigraphic units of short duration. This article falls between. None of the named species that I treat as synonyms have

particular stratigraphic significance as index fossils and are important mostly to document evolutionary processes.

This study does not formally synonymize names, nor name new species. I give my preferences to usage, reducing some named species to subspecies and others to subjective synonyms. Subspecies are used for closely related allopatric (geographically separate) forms, which are only slightly, but consistently, different morphologically. Since fossil forms in overlapping strata were essentially separated, I use subspecies for forms with only one major, consistent, morphological difference when in separate geologic formations, or, for the Recent forms, where they are allopatric. Where there is more than one consistent, significant morphological difference, I consider the forms separate, objective species. Careful statistical analyses (morphometrics) of larger suites of specimens (as done by Tursch, Greifeneder and Huart, 1998) is needed to objectively prove the status of the many forms. This assumes we are dealing purely with empty shells (morphospecies), in which we cannot directly observe interbreeding. DNA or similar analyses of Recent forms may also help us understand the relations of analogous fossil forms, but it too, is a tool that may not yield conclusive results.

Species of *Fasciolaria* Lamarck, 1799, Pliocene-Recent of Southern Florida: This section describes the *Fasciolaria* species from my collection and from published photographs and descriptions. Specimen numbers (#) refer to chart 1. Synonymy is not intended to be comprehensive.

Overall shape is useful for determining species within their subgenus. However many species have variable, overlapping shapes, so protoconch and early whorl sculpture is critical, especially for immature specimens. Color lines are also a possible determining factor. Dependant on preservation, they may be visible with regular light, with UV, or not at all. Color lines often but not always correspond with spiral striae, although not all striae will show color lines. Because color lines on the body whorl vary within species (often increasing in number with maturity), the number and position of lines on the apical whorls are diagnostic (see chart 1, page 30).

Fasciolaria sensu stricto is characterized by subsutural spiral cords on the body whorl. There may be spiral striae or cords overall, but this is variable within species. Many species have numerous color lines on the body whorl, but this is not consistent, nor restricted to this subgenus. All species in this group lack the apertural cord, but may have thickening inside the aperture just below the suture. A parietal glaze beyond the body whorl is common, but not always preserved.

***Fasciolaria (F.) t. tulipa* Linnaeus, 1758**
Murex tulipa Linnaeus, 1758.
Fasciolaria tulipa. Olsson and Harbison, 1953, Pl. 35, fig. 12. Abbott, 1974, p. 227, Pl. 10, fig. 2500.

This common species ranges from North Carolina to Brazil. Rosenberg gives an extensive synonymy on his website, including five synonyms. The specimen Petuch, 1994, refers to as this species (#35) apparently represents a variety of *F. t. okeechobeensis* Tucker and Wilson 1932. Recent shallow-water specimens in my collection show sculpture in a small percentage of specimens as incised lines corresponding to the color lines, otherwise having only about 3 to 4 large subsutural cords separated by wide grooves, and about 14 cords on the siphonal canal. The pleural angle varies about 10°, and color lines may be numerous, discontinuous or not visible. This species has an enlarged parietal area that can put a gloss on up to three whorls above the aperture. Although generally visible only on immature specimens due to erosion, this species has the usual half whorl of axial riblets following a smooth whorl, but with only weak spiral lirae on the next whorl, developing the strong subsutural cords thereafter (Olsson and Harbison, 1953).

Recent forms of *F. tulipa* show a wide range of variation with water depth and locality, similar to Recent *F. (Cinctura)* forms. A deep-water (200 feet) specimen illustrated by Sunderland and Sunderland (1999) is narrow (50° at about 8 whorls, 135 mm long), rather angular for about the first five whorls and has only two weak, shallow subsutural grooves. This form is now in the process of being named as a new species, analogous to *F. (C.) bullisi* (Kevan Sunderland, personal communication, 2001.)

***F. (F.) tulipa okeechobeensis* Tucker and Wilson, 1932**
Fasciolaria okeechobeensis Tucker and Wilson, 1932, p. 48, Pl. 1, fig. 6. Petuch, 1994, Pl. 52, fig. B.
Fasciolaria tulipa Dall, 1890, Pl. 7, fig. 11 (non Linnaeus, 1758). Petuch, 1994, Pl. 52, fig. B (non Linnaeus, 1758).

This subspecies is widespread in the early Pleistocene Bermont Formation. It is very similar to *F. t. tulipa* but with axial sculpture on the early whorls, and variable spiral sculpture across most of the shell. The holotype, from Port Mayaca, Martin Co., is 58 mm. It was described as being more slender than *F. tulipa*, but they overlap in shape. The holotype is unusual in having a broad siphonal canal, which may characterize that population.

This form has early sculpture of ½ whorl of axial sculpture starting after one smooth whorl, followed by 1¼ (up to 4½) whorls of weak to strong axial and spiral sculpture. The sculpture of the main whorls varies from sharp and narrow, to coarse spiral cords, to broad cords, becoming obsolete, below a more prominently crenulated, grooved subsutural area. The spiral angle at the sixth whorl is usually around 60°, but I have specimens up to 76°. A short, broad, fairly smooth specimen (#34) contrasts well with a rough, elongate, specimen (#33) of about the same size from the same DeSoto Pit. If this were a rare species, so that a large series connecting these forms could not be easily made, these forms would likely have been named separately. Similarly to *F. calusa,* its apparent ancestor, it has a large parietal area showing as a glaze on some of the spire whorls. This form is so variable and so close to the Recent form in some specimens, that it often cannot be reliably determined without well preserved early whorls.

***F. (F.) calusa* Petuch, 1994**
F. (F.) calusa Petuch, 1994, p. 291, Pl. 52, fig. D.
F. (F.) seminole Petuch, 1994, p. 294, Pl. 52, fig. C.

The typical form is represented by eight specimens in my collection from the Caloosahatchee from the DeSoto Pit and one immature specimen I collected from the Miami Canal near the type locality. These range from 22mm to 152mm (although one in a private collection is 225mm). This is probably the species listed in Olsson and Harbison (1953) as *F. tulipa* and is indeed very close in size, shape and sculpture. However, unlike *F. t. tulipa* and the similar *F. t. okeechobeensis,* there is no protoconch sculpture. The next 3 to 4 whorls have faint incised spiral striae. These are followed by nearly smooth whorls with a wide subsutural band set off by an incised thread with up to 4 diminishing incised spirals just below. The body whorl of mature specimens is covered by extremely faint to distinct incised spiral striae and weak raised cords on the siphonal canal. The pleural angle of mature specimens varies from 46° to 55°, sometimes decreasing as they elongate. My specimens do not show the narrow, elongate siphonal canal of the photograph of the holotype (#29), which appears to be rotated enough to show the edge of the parietal area, exaggerating the apparent narrowness. The shells are thin. There are about 15 colored spiral lines on the body whorl and a dark brown parietal area. Petuch described the shell as having a parietal glaze that covers the apex. Specimens without a preserved protoconch can be distinguished from relatively smooth *F. t. okeechobeensis* specimens by the relatively wide subsutural band, which can also distinguish them from *F. t. tulipa.*

The *F. seminole* variety is very similar to *F. calusa*, but shorter, broader, and rare. I have one specimen (#30) similar in size to the holotype (#31) from the Miami Canal. The pleural angle is seven degrees wider than that of *F. calusa.* It has a wide, smooth protoconch with no

visible sculpture until the fourth whorl, where faint subsutural striae start. At the body whorl, these form three weak subsutural cords with narrow interspaces. They merge into weak to very weak, widely spaced, incised striae on the upper body whorl and merge into weak raised cords on the siphonal canal. My specimen has a somewhat narrower and longer siphonal canal than the holotype and a slightly narrower spire angle, which reduces the difference from the typical *F. calusa* that were noted by Petuch in his description.

There is very little difference between *F. calusa* and *F. seminole*. Although I lack specimens to make statistical comparisons, the amount of variation does not seem significant, compared to the succeeding form, *F. t. okeechobeensis*. These probably also represent relatively deep and shallow water varieties of the same species.

***Fasciolaria (Cinctura)* Hollister 1957** first appeared in Florida in the Pinecrest Formation. It was characterized originally by the cord on the parietal wall just below the suture, not present in all species. These are the smooth forms, without subsutural cords (except for one species) and without sculpture in maturity (although sculpture may be strong on immature specimens). There are two Recent lineages in this subgenus. The Gulf of Mexico group is characterized by retaining the earliest pattern of three spiral color lines on apical whorls. The Florida group has only two, asymmetrically placed, with a relatively large blank area just anterior to the suture. Note that this group may show three lines when the shell is elongate and a larger proportion of the whorl is revealed, but they will be asymmetrically placed. The three-line pattern of the Gulf lineage is fairly symmetrical.

***F. (C..) lilium lilium* Fisher, 1807**

Fasciolaria lilium Fischer von Waldheim, 1807.
Fasciolaria (Cinctura) lilium. Hollister, 1957, p. 76, Pl. 6, figs. 1, 3-5.
Fasciolaria (Cinctura) lilium lilium. Abbott, 1974, p. 228, Pl. 10, fig. 2501.
Fasciolaria distans Lamarck,1822.
Fasciolaria distans branhamae Rehder and Abbott, 1951, Pl. 6, fig 4-5.
Fasciolaria (Cinctura) branhamae. Hollister, 1957, p. 80, Pl. 6. fig 6-8.
Fasciolaria (Cinctura) lilium subspecies or forma *branhamae*. Abbott, 1974, p. 228, Pl. 10, fig. 2503.

The name bearer of the lineage (#23-holotype of *F. distans*, #24-lectotype) is from Campeche, Mexico, with varieties from Texas and the Mississippi Delta. It is not known as a fossil in Florida, but is little different from *F. apicina* Dall, 1890, which apparently occurred from Florida to the Yucatan in the late Pliocene. It varies widely from broad to narrow and is similar to specimens of *F. l. hunteria* variety *tortugana* Hollister, 1957, best distinguished by its color pattern of three color lines on apical whorls. Note that it has both a smoothly rounded profile and a white parietal area, unlike *F. apicina*. It is similar to *F. evergladesensis* Petuch, 1991, but lacks the sometimes-exaggerated apical sculpture and the colored parietal area and has three apical color lines.

The *F. branhamae* variety (#26-holotype), also from the Campeche area but ranging into offshore Texas, has ¾ of a whorl of axial riblets on the protoconch and has no post-protoconch axial sculpture. It is more elongate, with a longer siphonal canal than the nominal subspecies, but there seem to be intermediate forms. This form was named as a subspecies of *F. hunteria* (as was *F. apicina*) because the earlier name *F. lilium* was overlooked. It was synonomized with *F. l. lilium* on Rosenberg's database. It probably evolved along with the nominotypical form in the early Pleistocene and represents the offshore form.

***F. (C.) lilium apicina* Dall, 1890.**

Fasciolaria (distans subsp?) *apicina* Dall , 1890, p. 102, Pl. 7, fig. 11b.
Fasciolaria (F.) apicina Olsson and Harbison, 1953, p. 215, Pl. 5, fig. 5.
Fasciolaria (Cinctura) apicina Petuch, 1994, Pl. 52, fig. M.
Fasciolaria (Cinctura) lindae Petuch, 1994, p. 292, Pl. 52, fig. F.

This abundant Caloosahatchee Formation species evidently evolved from *F. l. rhomboidea* Rogers and Rogers, 1839, between the time of the deposition of the Pinecrest Beds and the overlying Caloosahatchee. *F. l. apicina* is typically a broader species with a half whorl of riblets on the protoconch, following one smooth whorl. It has four or five spiral cords on the first 1½ post-protoconch whorls with strong axial cords, strongest near the base, forming elongate nodes. The spiral cords fade out on the fourth to fifth whorl. Most mature whorls are slightly thickened just at the suture. Most of my specimens from the Miami Canal show a slightly depressed area below the suture on the mature body whorl and a small, flattened shoulder on immature whorls. There are three spiral color lines on the apical whorls, seven to nine on the body whorl, with axial blotches rarely visible in UV light. The parietal area is dark colored (glowing brightly in UV light). There is one strong columellar plication surrounded by grooves set off by two very weak plications. The parietal cord in this species is fairly weak, sometimes obsolete. Specimens from the DeSoto Pit are usually very similar to Miami Canal specimens. Collected from float, they range from typical to specimens with exaggerated early sculpture. An extreme example is a 34 mm, 6-whorl specimen showing 10 broad cords separated by incised lines across the body whorl. The post-protoconch apical sculpture of broad, weak folds ends at the fourth whorl. This population is varied in spiral angle: a narrow, 100 mm, 9 whorl specimen narrows with growth from 42° at the 6th whorl to 35° at the aperture; a comparable length, broad specimen decreases from 50° to 42°. This population merges with and includes the very short and broad *F. lindae* variety. This population is also distinct in having a few specimens, that exhibit rugosity on the columella below the plicae, not unlike *F. l. evergladesensis* variety *capelettii* Petuch, 1994. Both broad and narrow forms exhibit this feature. The narrow forms, superficially like *F. capelettii*, can be distinguished by their relatively weak axial sculpture and the three color lines on the early whorls, where *F. capelettii* has only two.

F. l. apicina can generally be distinguished from specimens of the Recent *F. l. lilium* by the dark parietal area, which is white in the Recent subspecies. The subsutural depressed area of mature specimens and the shoulder on apical whorls, both common but not consistent in *F. apicina*, are not found on the Recent form, which has a smooth, simpler contour.

F. l. apicina variety *lindae* is a Caloosahatchee Formation analogue to the older *F. l. rhomboidea* variety *sarasotaensis* Petuch, 1994, but seems to occur wherever *F. l. apicina* is found (in southern Florida). This relatively uncommon, usually short, inflated form was described from the Miami Canal. I have three specimens from the Miami Canal, and except for being relatively short with rounded whorls, they are not distinguishable from the more common *F. l. apicina sensu stricto*. Note that the Miami Canal excavations include some species characteristic of estuarine environments, as well as of coral areas, so this variety may well have been restricted to shallow water. I also have nine specimens from the DeSoto Pit that I confidently assign to this form. A rigorous statistical comparison of the two forms was not done, but the variation in the 67 *F. l. apicina* specimens from the same pit seems to blend completely into the *F. lindae* variety. A large specimen collected from a small, private shell pit about 11 miles northeast of Bassinger (#7) has the first 6 whorls the same shape and size as a typically small specimen of *F. lindae*, but the mature whorls are shaped like typical *F. l. apicina*. It may be a different geographical variant of *F. l. apicina*, separate from the form described as *F. lindae*. Small specimens of *F. lindae* are very close in shape and sculpture to *F. l. evergladesensis* variety *holeylandica* Petuch, 1994 and can be best distinguished by having three color lines on the upper whorls, in contrast to only two on *F. holeylandica*. The presence of ribs on the protoconch distinguishes this form from *F. sarasotaensis*, as *F. apicina* is distinguished from *F. rhomboidea*.

***F. (C.) lilium evergladesensis* Petuch, 1991**

Fasciolaria (Cinctura) evergladesensis Petuch, 1991, p. 39, Pl. 6, figs. 13-15. Petuch, 1994, Pl. 52, figs. K,L.
Fasciolaria (Cinctura) lilium subspecies, Petuch, 1988, Pl. 23. fig. 5.
Fasciolaria (Cinctura) capelettii Petuch, 1994, p. 291, Pl. 52, fig. H.
Fasciolaria (Cinctura) holeylandica Petuch, 1994, p. 292, Pl. 52, fig. 1.

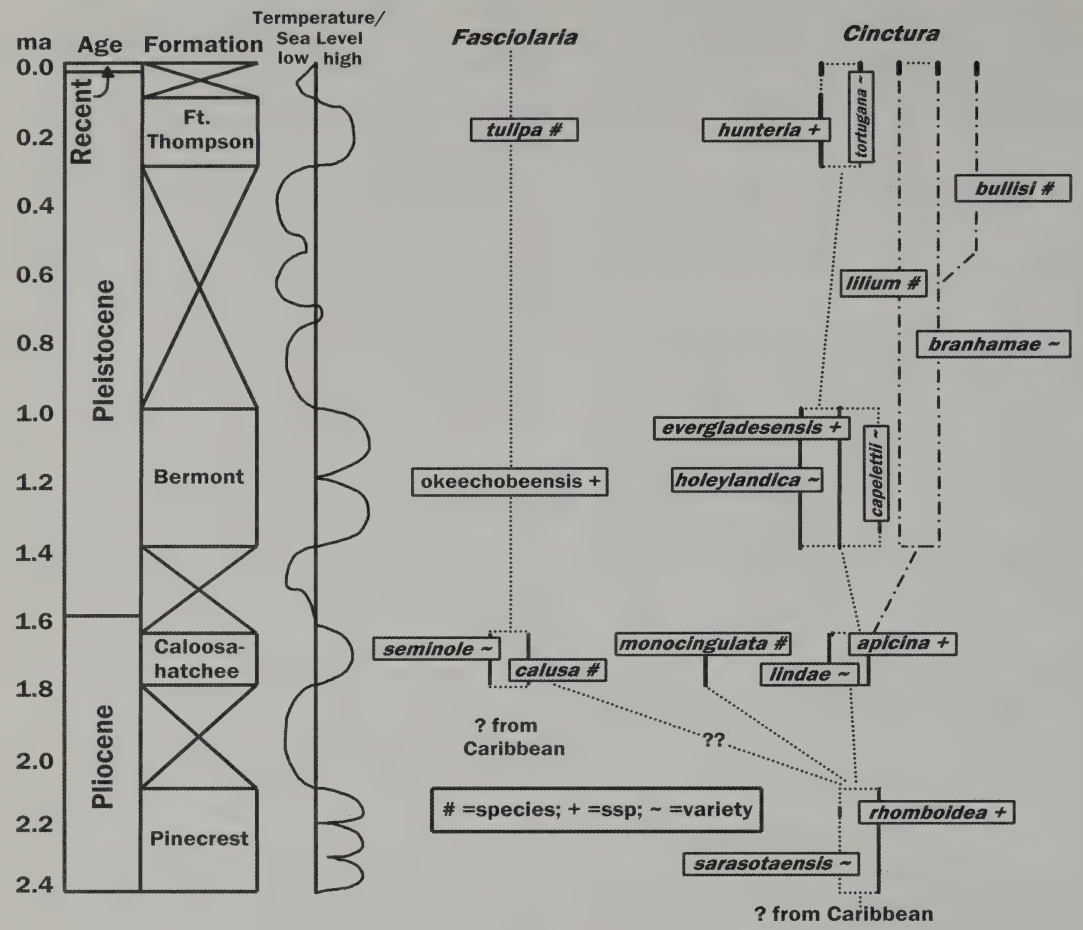


Figure 1. ***Fasciolaria*** **family tree– Southern Florida and Gulf of Mexico**

This is a visual summary of my subjective understanding of the evolution within the genus in southern Florida from the Late Pliocene to the Recent. It is not based upon a cladistic analysis, but rather on stratigraphic placement. Vertical lines represent the approximate known extent of individual named forms. Dotted lines are conjectural. Slanted lines represent morphologic changes during the times of low sea level between formations. Broader forms and the *Fasciolaria sensu stricto* lineage are placed to the left of narrower forms and the *Cinctura* lineage. *F. l. lilium* and its descendants are connected to *F. l. apicina* by a broken line, as they lack a known fossil record and their position is tenuous. Hypothetical connections to earlier Caribbean forms are treated similarly.

The chart is scaled by absolute ages (given in millions of years before the present) from Morgan and Hulbert (1995). Both relative and absolute ages are controversial (compare for example, Campbell, 1993 or Petuch, 1995) and may be far from reality. The temperature and sea levels shown are diagrammatic and not based upon hard data.

Because most other genera in the subfamily Fasciolariinae have sculpture of dominantly spiral cords (e.g. *Terebraspira*), have axial protoconch riblets, and include species with parietal cords, it is likely that the earliest *Fasciolaria* species were similar. This is consistent with the presence of sculpture on the early whorls of most species and would imply the nominotypical subgenus is the oldest, from which the *Cinctura* group evolved. However the oldest known Floridian *Fasciolaria* species is a *Cinctura* species, *F. rhomboidea*, which lacks axial sculpture. This species probably evolved during the Early Pliocene (possibly from *F. semistriata* Sowerby, 1850 reported from the Mio-Pliocene Cercado and Gurabo Formations of the Dominican Republic by Vokes, 1979), migrating north from the Caribbean. However, the early whorls of the earliest known Floridian *Fasciolaria (Fasciolaria)* species *(F. calusa)* are nearly smooth and lack protoconch sculpture. As Dall (1890) suggested, *F. l. rhomboidea* may possibly be the ancestor. More likely, however, the nominotypical subgenus moved into the area late in the Pliocene, again from the Caribbean. If not, it is a polyphyletic group; assuming *F. semistriata* is also assigned to this subgenus. Note that *F. monocingulata* and *F. bullisi* have characteristics that fall between the subgenera as they have been originally defined. *F. l. apicina* probably lived from North Carolina to southern Florida and across to the Yucatan. Petuch (1988) considers the Yucatan a 'secondary relict pocket,' and a 'refugium' area. It contains species derived from Pliocene forms and species found only as Pleistocene fossils in Florida. *F. l. lilium* should be added as a derivative of the Pliocene *F. l. apicina*. It was replaced in the early Pleistocene by the newly evolved *F. l. evergladesensis* forms in Florida, and by *F. l. lilium* (including *F. branhamae*) in the Campeche Bay area. *F. bullisi* subsequently evolved from *F. l. lilium* in the Gulf of Mexico, but without fossils to study, the dates are unknown and their position on the chart conjectural.

The early Pleistocene Bermont Formation includes a pair of closely related narrow (*F. l. evergladesensis*) and broad (*F. l. evergladesensis* variety *holeylandica*) forms in the evolving *F. lilium* lineage, as well as an even more elongate, deeper water form, *F. l. evergladesensis* variety *capelettii*. I have a fairly large suite of immature to mature specimens of these two forms from South Bay, as well as other Bermont localities. An analysis of pleural angle and axial teleoconch sculpture (the essential differences in the type descriptions) shows a complete overlap of these forms. They fall on a broad, continuous swath between specimens with four whorls of apical axial sculpture with an apical angle of 45° and those with 2½ whorls of axial sculpture with an apical angle of 65°. *F. l. evergladesensis* variety *capelettii* has not been treated statistically, but specimens from the type locality also intergrade with *F. evergladesensis*. All of the forms have two color lines on the apical whorls and a dark parietal area.

The typical *F. evergladesensis* form, common in the Bermont, was named from small (48 mm holotype (#13)) specimens from the North New River Canal, 22 km south of South Bay, Palm Beach Co. Possibly restricted to the eastern Everglades basin, it was characterized by shape like a somewhat narrow *F. apicina* but with smoothly rounded whorls, lacking the thickened suture, slight shoulder, and slight subsutural depression common in its direct ancestor and by the prominent noded sculpture that extends through the fourth whorl. It is extremely variable in the amount and strength of the early sculpture, in the spire angle and in other details.

The *F. holeylandica* variety was described from the Griffin Brothers Pit, north of the southern border of Palm Beach County about 10 km west of the North New River Canal. Although described from the lowest portion of the Bermont Formation (the Holey Land Unit Fauna of Petuch, 1994), it occurs commonly throughout the Bermont. The holotype (#15) is an unusually large specimen (8 whorls, 80 mm long), showing a distinct increase in pleural angle from 60° to 65°. Specimens from South Bay generally have a smaller, less variable angle (mostly about 55° to 60°) and are smaller at about 55 mm and 7 whorls (#16). I have specimens up to 74 mm from the Capeletti Pit (#17). The protoconch is the same as the typical *F. l. evergladesensis* form, and the early whorls show axial elements for the next ¾ to 1¾ whorls. The axial elements start as equal to the spiral and gradually fade out, forming elongate points on the lower spirals. Details of the siphonal canal sculpture are as *F. l. evergladesensis*, and the color spirals vary from 6 to 9 on the body whorl with only two on the upper whorls.

The *F. capelettii* variety was described from the Dade County Capeletti Pit. It is a narrow, elongate form, reportedly associated with deeper water fauna from a trough. The holotype (#19) is distinct from the contemporaneous *F. l. evergladesensis sensu stricto* and *holeylandica* varieties, occurring in the same pit. It has weaker sculpture than *F. evergladesensis*, is larger (eight whorls and 95 mm), narrower (at 41°) and has thicker plicae and small irregular rugae on the columella. It also has 10 to 12 spiral color lines on the body whorl, but, consistent with *F. l. evergladesensis*, it has only two color lines on early whorls. Specimens I collected from the type locality are much closer to the *F. l. evergladesensis sensu stricto* form than is the *F. capelettii* holotype. The larger specimen (#20), at 9 whorls, is greater than 109 mm long. It is slightly wider (at 45°) and has the same columellar plicae as *F. l. evergladesensis* but with the rugae of *F. capelettii*. It has the same exaggerated early sculpture as *F. l. evergladesensis* and only eight color lines. I cannot separate these forms. There are no characteristics that do not apparently intergrade. All three named *Fasciolaria* (*Cinctura*) species from the Bermont therefore form one intergradational population, varieties of *F. lilium evergladesensis*. The *F. capelettii* variety is most similar to the Recent *F. l. hunteria* variety *tortugana* Hollister, 1957, which reflects an ancestor/descendant relationship. It can best be distinguished by the rugosity on the columella and relatively long siphonal canal. Other details vary too much to be considered useful.

***F. (C.) lilium hunteria* G. Perry, 1811**

Pyrula hunteria G. Perry, 1811.
Fasciolaria distans Reeve, 1847 (non Lamarck, 1822).
Fasciolaria (C.) hunteria. Hollister, 1957, p. 82, Pl. 6, figs 2, 11-13.
Fasciolaria (C.) lilium hunteria. Abbott, 1974, p. 228, Pl. 10, fig. 2502.
Fasciolaria (C.) lilium tortugana Hollister, 1957, p. 79, Pl. 6, figs. 9-10.
Fasciolaria (Cinctura) lilium subspecies or forma *tortugana* Hollister. Abbott, 1974, p. 228, Pl. 10, fig. 2504.

This common, broad, shallow water, late Pleistocene to Recent *F. lilium* subspecies can be distinguished from both the Bermont *F. l. evergladesensis* variety *holeylandica* and from the Recent *F. l. lilium* by the greatly reduced sculpture on the early whorls. There is no axial sculpture, and the weak spiral sculpture is often lost to erosion as the snail grows. This form is known from North Carolina to Mobile Bay, as well as the Yucatan Peninsula. There are only two color lines on apical whorls. I have 10 small specimens (#21 and #22) of *F. l. hunteria* from the base of the Fort Thompson Formation from a pit in Okeechobee, Okeechobee County. These show a great range of pleural angle, 43° to 58°, implying that homeostasis had not yet set in.

Although most collectors are familiar with the broad, 60 to 75mm shallow-water form of *F. l. hunteria*, Sunderland and Sunderland (1999) picture a 115mm specimen from 30 feet deep that looks very close to their photographs of *F. tortugana*. Rosenberg treats *F. tortugana* as a synonym of *F. hunteria*, which he considers an objective species. This subspecies clearly evolved from the Bermont Formation's *F. l. evergladesensis*.

The offshore variety *F. tortugana* (#25) has retained the protoconch sculpture and is distinguished from *F. l. lilium* by color line pattern and an elongate spire with a relatively short siphonal canal. The color line patterns of *F. l. hunteria* and the *F. tortugana* form are very similar, except the elongate whorls of *F. tortugana* sometimes expose a third color line. The *F. tortugana* variety is generally found offshore wherever *F. l. hunteria* is found (Sunderland and Sunderland, 1999).

***F. (C.) lilium rhomboidea* Rogers and Rogers, 1839.**

Fasciolaria rhomboidea Rogers and Rogers, 1839, p. 376, p. 102, Pl. 30, fig. 3; Dall, 1890, p. 102; Campbell, 1993, p. 85, Pl. 37, fig. 411.
Fasciolaria (C.) rhomboidea Rogers and Rogers. Petuch, 1994, Pl. 52, fig. N.
Fasciolaria sarasotaensis Petuch, 1994, p. 293, Pl. 52, fig. J.

This is a widespread Pliocene form described from Virginia. It is characterized by its elongate form, moderately long siphonal canal, smooth 1½ whorl protoconch followed by about ¾ to about 2 whorls of weak axial and spiral sculpture. Petuch (1994) figured a specimen (#1) with a nearly consistent apical angle (40°-42°) from the Pinecrest Beds at a Sarasota pit. Campbell (1993) illustrated a relatively short, inflated, immature (59mm, ~6 whorls) specimen from the time equivalent Yorktown Formation in Virginia with a pleural angle of about 50°. Although it looks more like *F. l. apicina* than *F. l. rhomboidea*, the lack of axial protoconch sculpture distinguishes it. Specimen (#3), also from Sarasota, has a spire angle that decreases from 60° at the fourth whorl to 55° at the fifth to 37° at the aperture, giving the spire a convex look. Although it is without data, the shell is stained black in part and probably had been from, or near, estuarine sediments (the 'black layer,' Unit 4 of Petuch, 1994).

F. l. rhomboidea variety *sarasotaensis* was reported only from Petuch Unit 4 of the Pinecrest Beds at Sarasota. The holotype (#4) is a small, inflated form. It retains an expanded apical angle (about 60°) throughout its 5½ whorls. It differs slightly in having more cords on the siphonal canal and only four, progressing to three, spiral cords on the early whorls. The shortening of the whorls exposes fewer cords. This form, reported only from estuarine deposits, probably represents an ecologically controlled variety (ecophenotype) of an otherwise typical *F. l. rhomboidea*, but, of course, we have no soft parts to compare. I also lack specimens to compare the shells statistically, although shell #3 does strongly suggest overlap. I have reduced the name to a synonym based largely on analogy with other species in the *F. lilium* lineage, which show similar plasticity of form. If, however, the separation between the offshore and estuarine forms caused a true genetic difference to develop, preventing interbreeding, then the

(Continued on page 29.)

Shell Collecting in Iceland

Part I The Colours

Moshe Erlendur Okon
Photos by **Dan Karmeli**

I'll admit; there are no cowries in Icelandic waters. No tent patterned cones, or any cones, for that matter. No attractive volutes either. Yet to me, shell collecting in Iceland is such a fascinating experience that I have spent hundreds of hours collecting, sorting, studying, and discussing this Northern Atlantic island's molluscan fauna.

In this series of short articles, I intend to focus on different aspects of shell collecting in Iceland. I will deal with methods of collecting as well as the shells themselves. Iceland is situated between 63°N and 67°N (just below the Arctic Circle) and between 13°W and 25°W. The island is 500 km long and 313 km wide with 4,900 km of coastline.

While the western part of the island enjoys a warm current branching off the North Atlantic Drift, the eastern part receives a cold current branching off the East Greenland Current. Seawater can freeze in the west, north and east and the temperatures all year round are quite low (average of about 11 degrees centigrade in July).

Thus, the molluscan fauna of the island is made up of parts of the European fauna (south east and south west areas of Iceland), the Western Atlantic fauna (west) and the Arctic fauna (north). The low temperatures, as well as very violent weather conditions, also influence the molluscan fauna, as do, of course, the dietary conditions. There is no sea pollution to speak of.

Most of the shells found in Icelandic waters are whitish and drab. Some are dark gray or brown. However, if one searches carefully enough, pleasant surprises are in store. Here are a few examples of very common shells found in Iceland. The color forms presented below are uncommon to rare, and one must search for a long while before finding them.

Littorina obtusata (L., 1758) and ***Littorina fabalis*** Turton, 1825. These two names (together with several others: *littoralis*, *mariae*, *palliata*) have caused many difficulties in nomenclature and there is much confusion as to the synonymy involved. These shells can be found on different kinds of kelp in the intertidal zone (*Fucus* sp., *Palmaria* sp., *Laminaria* sp., *Punctaria* sp.) as well as on rocks.

A group of brightly colored large shells over 20mm (probably *L. obtusata*) is known to live at a river mouth in the south. The color forms shown here are not exhaustive, but represent the wide range found in this area. They were all collected in the Faxafloi bay area (west Iceland), and I have not been able to determine a correlation between habitat and color. Often one can find two distinct color forms on the same rock or seaweed branch.

Poppe & Goto, 1991 mention several color forms, such as *alternata*, *reticulata*, *rubens*, *citrina*, etc. The blue and white banded form (second row from top, second shell from left) seems to be the most difficult to find. The red-brown and yellow-banded shells (form *alternata*) are also very uncommon.

Littorina saxatilis (Olivi, 1792). This shell is a dweller of the intertidal zone, and can be found on rocks higher than the normal high tide line. It can reach 20 mm. The *saxatilis* group is extremely variable, and is probably made up of several distinct species – see Smith, 1982 and Poppe & Goto, 1991 (some of which were named above as forms). The specimens depicted were all collected in a limited area of Faxafloi Bay.

Nucella lapillus (L., 1758). This too is an extremely common shell in the intertidal zone and is also present in deeper waters. It can be found together with *L. fabalis*, beached by thousands in certain places. It may reach 40mm and there are differences in shape depending on habitat. All of the shells depicted here were collected in the Faxafloi Bay area (apart from the left shell, top row, which was dredged at 15m and has a somewhat different shape).

There are also many named color forms of this species (*bizonalis*, *aurantiaca*, *lactea*, etc., see Houart, 2001). As these animals live in extremely rough conditions, it is not difficult to find shells with damage and repair. Sometimes the color changes from the point of repair and onwards (note the shell in the middle row, second shell from left).

Chlamys islandica (Müller, 1776). This edible species dwells in shallow to very deep water. Scallop trawling is common in Iceland and I will refer to my experiences on these boats in more detail in a future article. The shells are variable both in color pattern and in the intensity of the colors. The right valve is lighter and rests on the sea bottom, while the darker valve faces up and is usually covered in barnacles and other growth. The shell is equivalve with longer anterior ears.

The most common color is a uniform pink to purple. Less common are the shades of brown and orange. There are also extremely light colored specimens. The color can be saturated through to the interior of the valves. The pattern almost always consists of radial rays of a lighter shade, but many shells have concentric patterns as well. Some specimens are truly fascinating (though the trawling method causes much damage to most shells). The shells depicted below were trawled at thirty meters in the Faxafloi Bay.

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Above: Many color forms of *Littorina obtusata* (L., 1758) (the larger shells) and *Littorina fabalis* Turton, 1825 (smaller shells in the right-hand column). The most common color form is olive green. The largest shell is 16mm, smallest 7mm. Below: A selection of *Littorina saxatilis* (Olivi, 1792). The most common color form is light brown. Note the light purple shell (third from left, top row). The largest shell is 16mm, smallest 11mm. Coll. M.E. Okon

Above: Several color forms of *Nucella lapillus* (L., 1758). The most common color form is brown or gray. Shells living on old constructions will often be covered with rust (second shell from left, bottom row). The largest shell is 33mm, smallest 19mm. Coll. M.E. Okon. Below: Exterior and interior view (three pairs on left) and exterior view (three pairs on right) of *Chlamys islandica* (Müller, 1776). Note that two shells with similarly colored valves may have saturated or unsaturated interiors (two lower pairs on left). Note also almost completely white specimen. The largest shell is 83mm. Coll. M.E. Okon.

A close encounter with a live *Tonna galea* (Linné, 1758) and its eggs

Paolo G. Albano (text) (*) & Roberto Perrella (photographs) (**)

The *Tonna galea* photos were taken August 2002 while scuba diving off the north side of S. Andrea Island (Lecce, Southeastern Italy). The island is uninhabited, but faces the city of Gallipoli, which hosts a busy fishing port. The *Tonna* was encountered while diving in 5m on a sandy bottom with rocky areas near shore. Two hundred meters offshore, the bottom descends to 15m deep and a *Posidonia oceanica* Linné (Delile) field starts.

It was a striking encounter because the specimen was alive and laying eggs (top photo). The eggs were just left on the sandy bottom without any special protection. The specimen was not collected and was left undisturbed after we finished taking the photographs. The bottom left photo is a closeup of the egg mass.

From Mifsud (1995) we learn that *Tonna galea* is one of the largest gastropods in the Mediterranean Sea. It prefers sandy bottoms down to 120m, where it usually lays its eggs. It has been observed eating holothurians such as *Holothuria tubulosa* (Gmelin).

Tonna galea is common in the area and we have personally observed alive down to 40m..

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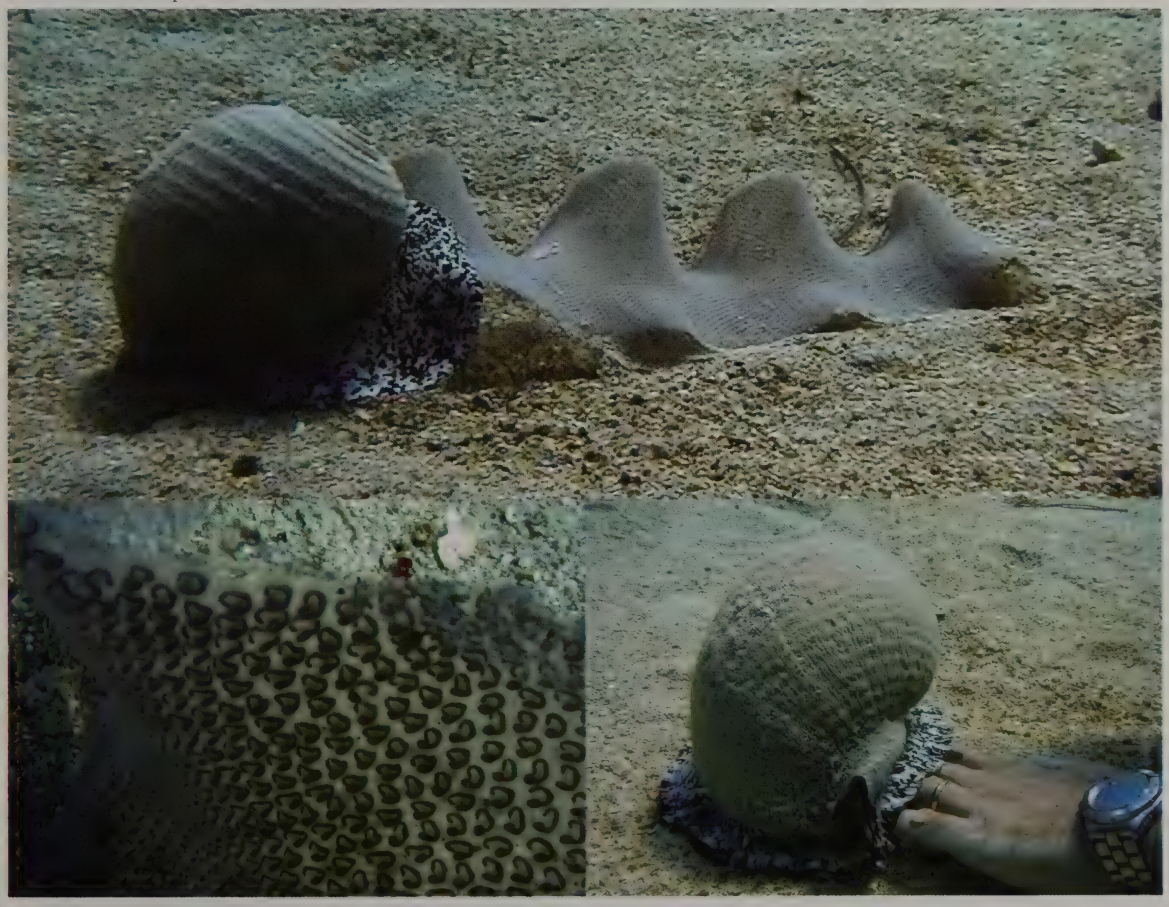

Unexpected molluscan finds from the hydrocarbon vents off the Louisiana coast.

by
Emilio Fabián García

Among the interesting marine ecological niches found off the Louisiana coastline are a series of deep-water hydrocarbon cold vents that occur along the entire length of its continental slope. Colonies of chemosynthetic organisms, which derive their energy from hydrocarbons, are found here, including tubeworms, bacterial mats, and bivalve mollusks of the genera *Bathymodiolus*, *Acesta*, *Lucinoma*, *Calyptogena*, *and Vesicomya* (Kennicutt et al., 1985).

Although much has been written about hydrothermal vents, not much was known about hydrocarbon cold vents until less than twenty years ago. In a study published by Paul Ahron (1994), he states that in this type of vent the interaction between the biological and the geological systems is more complex because of the low temperatures and that the diversity is greater. This sentiment is echoed by Robert S. Carney (1994) who, among others, considers these chemosynthetic communities analogous to a desert oasis. This analogy arises from the fact that, while areas surrounding hydrocarbon vents are faunistically poor, the immediate vicinity of the vents is rich in numbers of specimens and diversity of species.

Although bivalve mollusks are numerically the most abundant, a large number of gastropod species inhabits the vents. Two endemic species, *Bathynerita naticoidea* Clarke, 1989 and *Provanna sculpta* Warén & Ponder, 1991, were reported by Warén & Bouchet (1993), together with *Metula canetae* (Clench & Aguayo, 1940), *Cantrainea macleani* Warén & Bouchet 1993, *Cataegis meroglypta* J. McLean & Quinn, 1987, *Gaza fischeri* Dall, 1889, *Gymnobela extensa* (Dall, 1881), *Cancellaria rosewateri* Petit, 1983, and *Hyalorisia galea* (Dall, 1889).

In August of this year, Dr. Darryl Felder, head of the Biology Department at the University of Louisiana at Lafayette, brought me a small box of empty shells collected by means of a grab box from an area of hydrocarbon vents known as "Bush Hill," and asked me to provide identifications. This area is located at 27°46.9'N, 91°30.29'W, in 546 to 555 m. The material, all collected in a single day, consisted of a complete pair of *Pleuromeris tridentata* (Say, 1826), several pairs of *Lucinoma atlantis* R. A. McLean, 1936 (Figure 6), an undescribed *Lucinoma* sp. (Figure 7), one specimen of the turbinid *Cantrainea macleani* Warén & Bouchet, 1993 (Figure 1), several specimens of the trochid *Cataegis meroglypta* J. H. McLean, 1987 (Figure 2), a very broken specimen of *Oocorys bartschi* Rehder, 1943, an immature specimen of *Cerithium litteratum* Born, 1778, an unknown buccinid in the genus *Mohnia* (Figure 5), a specimen of a *Daphnella* sp. aff. *corbicula* Dall, 1889 (Figure 4); and two specimens *Eccliseogyra formosissima* (Jeffreys, 1884) (Figure 3). This epitoniid species was quite a surprise, since Jeffreys' taxon was previously known only from Portugal, the Azores, and Morocco (Bouchet & Warén, 1986), on the other side of the Atlantic.

FIGURES 1-7: 1. *Cantrainea macleani* Warén & Bouchet, 1993- 17mm. **2.** *Cataegis meroglypta* J. McLean, 1987-18mm. **3.** *Eccliseogyra formosissima* (Jeffreys, 1884)- 19 mm. **4.** *Daphnella* sp. aff. *corbicula* Dall, 1889 -6 mm. **5.** *Mohnia* species- 21 mm. **6.** *Lucinoma atlantis* R. A. McLean, 1936- 55 mm. **7.** *Lucinoma* sp. - 50 mm.

Since both specimens are in fresh condition, there is no reason to doubt that this species inhabits the area and forms part of the hydrocarbon vent ecosystem. Although the *Oocorys* and the *Daphnella* have not been reported from the vents area, they are presumed transient species, since the single specimen of each of these species is very worn. However, the unreported *Eccliseogyra*, together with other unreported taxa such as the *Mohnia* sp., indicate that much more work needs to be done in the hydrocarbon vents to have a better understanding of its biodiversity.

My thanks to Dr. Harry G. Lee for reviewing the manuscript, as well as for taking the photographs that accompany this work.

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(Fasciolaria - Tulip shells, continued from page 23.)

'plastic' broke and a separate taxon must be acknowledged. If this is the case, this form would be best treated as another subspecies of *F. lilium*. This is analogous to my treatment of *F. l. hunteria* in the Recent fauna.

***F. (C.) bullisi* Lyons, 1972**

Fasciolaria bullisi, Lyons, 1972, pg. 96, fig 1.
Fasciolaria (Cinctura) lilium subspecies or forma *bullisi*. Abbott, 1974, p. 228, Pl. 10, fig. 2505.

This distinct form (#27, holotype) is unusual in lacking a subsutural parietal cord and having crowded, broken color lines, not unlike the nominotypical subgenus. It is from the deepest water (over 70 meters) of the Recent forms, occurs off western Florida, and is the most elongate. It is treated as a full species in Rosenberg's database. It probably evolved from *F. l. l.* variety *branhamae*, which also has ¾ of a whorl of axial cords on the protoconch and a long siphonal canal. Its characteristics suggest *F. (Fasciolaria)* and reflect the relatively short time (about 2.4 million years—see fig. 1) that the subgenera have been separate. (See also *F. l. monocingulata* (below) for a similar problem.) Probably the lack of a parietal cord is a secondary loss.

***F. (C.) monocingulata* Dall, 1890**

Fasciolaria (distans var?) monocingulata Dall, 1890, p. 103.
Fasciolaria (Fasciolaria) monocingulata Dall. Petuch, 1994, Pl. 52. fig. E.

This is an uncommon, inflated Caloosahatchee form, slightly smaller than *F. l. apicina*. This distinctive species has a flattened, crenulated, adpressed suture set off by an incised thread and a narrow shelf, analogous to that of the nominotypical subgenus. However, the subsutural parietal cord of this species is the same as in almost all forms of subgenus *Cinctura* and does not show up in any known member of *F. (Fasciolaria)*. The shell is thick, as is *F. apicina*, unlike the contemporary *F. (F.) calusa* Petuch, 1994, including the variety *F. seminole* Petuch, 1994. It also exhibits variable erosion above the suture on the body whorl of mature specimens (as does *F. apicina*, to a lesser degree), in contrast to the enlarged parietal area that covers this area in *Fasciolaria sensu stricto*. I have one mature specimen of this species (#11) from the Miami Canal, and two from the DeSoto Pit, all lacking the protoconch (as does the holotype). This species probably evolved from *F. l. rhomboidea* as a sister species of *F. l. apicina* and apparently has neither intermediate forms nor descendents. The set-off sutural area is a 'throwback' to the probable *Fasciolaria (Fasciolaria)* ancestors of *F. (C.) rhomboidea*. Similarly, the presence of sculpture on the protoconch, a 'primitive' characteristic, disappears and reappears in the evolutionary history of the group. Genetically determined characteristics can be disabled and not totally lost, but switched back on in later forms.

Key to named *Fasciolaria* forms – Southern Florida and Gulf of Mexico

1. Subsutural grooves present on body whorl: go to 2. No subsutural grooves present: go to 6.
2. Parietal ridge present in aperture: *F. monocingulata*. No parietal ridge present: go to 3.
3. Axial sculpture on protoconch: go to 4. No axial sculpture on protoconch: go to 5.
4. Post-protoconch axial sculpture present: *F. okeechobeensis*. No post-protoconch axial sculpture present: *F. tulipa*.
5. Apical angle about 65°: *F. seminole*. Apical angle about 55°: *F. calusa*
6. Color lines (usually 2) restricted to anterior 2/3 of spire whorls: go to 7. Color lines (3 or more) spaced evenly over whorl: go to 11.
7. Axial sculpture present on first post-protoconch whorl: go to 8. No axial sculpture present: *F. hunteria*
8. Apical angle >55°: *F. holeylandica*. Apical angle <55°: go to 9.
9. Axial apical sculpture with strong nodes: go to 10. Apical sculpture not noded: *F. tortugana*.
10. Rugosity present on columella: *F. capelettii*. Columella without rugosity: *F. evergladesensis*.
11. Axial ribs present on protoconch: go to 12. Protoconch without axial ribs: go to 15.
12. Ribs on ½ whorl: go to 13. Ribs on ¾ whorl: go to 16.
13. Mature whorls smooth: go to 14. Whorls thickened at suture with slight subsutural depression, parietal area dark: *F. apicina*.
14. Apical angle about 60°, parietal area dark: *F. lindae*. Apical angle about 50°, parietal area clear or white: *F. lilium*.
15. Pleural angle about 60°, shell small: *F. sarasotaensis*. Pleural angle 35° to about 50°, shell large: *F. rhomboidea*.
16. Parietal cord present in aperture: *F. branhamae*. No parietal cord present: *F. bullisi*

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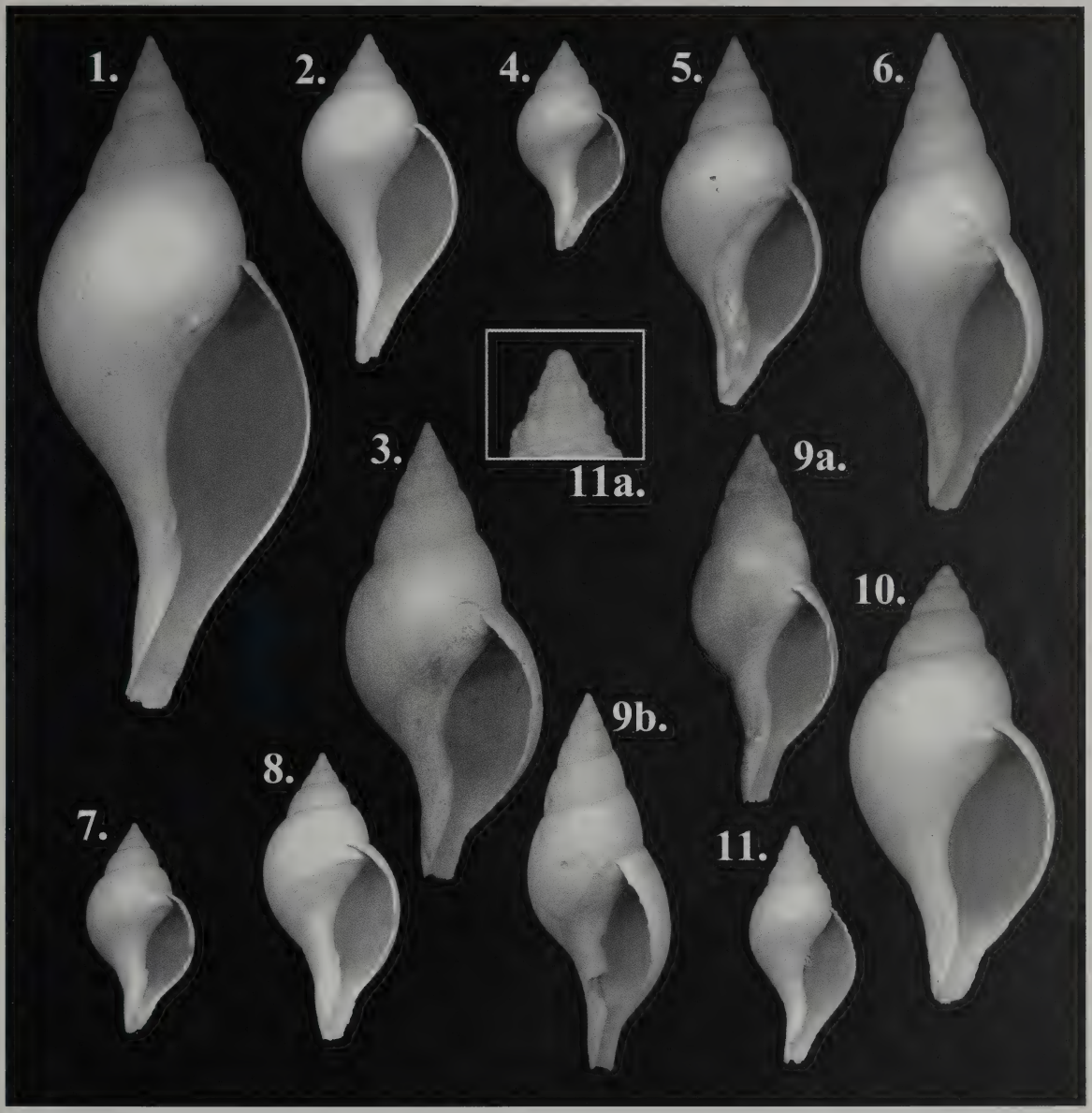
#	Species or variety	Length mm	Width % of L	Spire % of L	# of whorls	Apical Angle	Pleural Angle	Axial Proto	Axial Teleo	Source
1	*rhomboidea*	115	~40	~42	~9	42	40	?none	?	A
2*	*rhomboidea*	79	42	43	8	47	38	none	1 ¼	B
3*	*rhomboidea*	78	42	43	8	50	37	?none	3/4	B
4	*sarasotaensis*	33	52	32	~5 ½	-	61	?none	~2	C
5*	*apicina*	95	45	41	8 ¾	51	45	1/2	1 ½	D
6	*apicina*	26	47	35	4 ¾	-	46	1/2	?	E
7*	*apicina? lindae?*	113	42	37	8	63	47	?	1	F
8*	*apicina*	71+	43	39	7 ½	43	45	1/2	1	G
9*	*lindae*	45	53	40	7	61	58	1/2	2 ½	D
10*	*lindae*	71+	~50	~40	8	62	53	1/2	2	D
11*	*monocingulata*	94+	48	38	~8	61	50	?	?	D
12*	*evergladesensis*	65+	51	34	6 ¾	58	56	1/2	2 ¼	H
13	*evergladesensis*	48	46	35	~7	46	47	1/2	3 ½	E
14*	*evergladesensis*	80	44	43	8 ½	52	42	1/2	2 ¼	H
15	*holeylandica*	80	53	32	~8	60	65	1/2	2	E
16*	*holeylandica*	53	49	38	6 ¾	62	57	1/2	1	H
17*	*holeylandica*	74	47	36	7 ½	57	50	1/2	1 ½	I
18*	*holeylandica*	49+	49	35	6 ½	65	65	1/2	3/4	H
19	*capelettii*	95	42	44	~8	37	40	1/2	3 ½	E
20*	*capelettii*	109+	39	41	9	45	43	1/2	2 ½	I
21*	*hunteria*	61	49	39	7 ½	65	58	none	none	J
22*	*hunteria*	57+~5	44	42	~7	50	43	none	none	J
23	*lilium*	103	44	44	~8	~48	43	1/2	1 ½	K
24	*lilium*	82	50	41	~8	~50	~50	1/2	1 ½	L
25	*tortugana*	98	44	47	~9	~47	~42	1/2	1 ½	E
26	*branhamae*	126	41	38	8 ¼	~50	47	3/4	none	E
27	*bullisi*	134	35	41	~8	43	36	3/4	none	E
28*	*calusa*	135	46	32	8 ½	53	50	none	none	M
29	*calusa*	94	45	28	~7	55	55	none	none	E
30*	*seminole*	70	50	31	6 ½	66	62	none	none	M
31	*seminole*	64	53	27	7 ½	66	66	none	none	E
32*	*okeechobeensis*	103	48	32	7 ¼	64	55	½?	?	H
33*	*okeechobeensis*	50	44	38	6 ¼	50	50	1/2	~4	M
34*	*okeechobeensis*	38	68	26	5 ½	-	76	1/2	~1	M
35	*okeechobeensis?*	69	54	26	~7	~75	67	?	?	A
36*	*tulipa*	79	44	39	6 ¾	56	50	½?	none	N
37*	*tulipa*	73	48	47	¾	68	57	½?	none	O

Chart 1: Data of specimens noted (by number) in the text. Specimens are from my collection (*), or were measured from published photos or the referenced description. The width and spire length are given as a percentage of total length. The number of whorls includes approximately 1 ½ protoconch whorls. 'Apical Angle ' is the spire angle as measured in contact with whorl number 5 and 6. 'Pleural Angle' is the spire angle measured in contact with the lip and the penultimate whorl. 'Axial proto' describes the protoconch as having '1/2', 'none' or '3/4' of a whorl of riblets. 'Axial teleo' is the number of teleoconch (post-protoconch) whorls that show axial sculpture. Spiral sculpture often covers more whorls than axial sculpture does, but I did not measure it. Source of specimens:

A. Petuch, 1994.
B. Sarasota: Various pits (generally known as APAC), Sarasota Co.
C. Holotype
D. Miami Canal: 7 to 20 miles south of Bay Harbor, Palm Beach Co.
E. Olsson and Harbison, 1953
F. 11 miles northeast of Bassinger, private pit.
G. 10 miles south of Bassinger, Highlands Co., Kissimmee River dredgings.
H. South Bay: North New River Canal dredgings Palm Beach Co.
I. Capeletti Pit: NW 47 Street, 1 mile west of Florida Turnpike, Dade Co.
J. Okeechobee pit: private pit in Okeechobee, Okeechobee Co (?)
K. Holotype—*F. distans*—Hollister, 1957.
L. Lectotype—*F. lilium*—Hollister, 1957.
M. DeSoto Pit: 15 km (about 10 miles) south of Arcadia, De Soto Co., collected by Phyllis Diegel.
N. Unknown.
O. Grassy Key, Dade Co., about 1 meter.



1. *F. (F.) calusa* Petuch, 1994 [28,29]
2. *F. (F.) calusa* variety *seminole* Petuch, 1994 [30,31]
3. *F. (C.) lilium apicina* Dall, 1890 [5,6]
4. *F. (C.) lilium apicina* variety *lindae* Petuch, 1994 [9,10]
5. *F. (C.) lilium evergladesensis* Petuch, 1991 [12-14]
6. *F. l. evergladesensis* variety *capelettii* Petuch, 1994 [19,20]
7. *F. l. evergladesensis* variety *holeylandica* Petuch, 1994 [15-18]
8. *F. (C.) lilium hunteria* G. Perry, 1811 [21,22]
9. *F. (C.) lilium rhomboidea* Rogers and Rogers, 1839 [1-3]
10. *F. (C.) monocingulata* Dall, 1890 [11]
11. *F. (F.) tulipa okeechobeensis* Tucker and Wilson, 1932 [32-35]

11a. Central inset is a close up of the axial structure on the spire of F. (F.) tulipa okeechobeensis.

Numbers in brackets [ ] refer to specimen numbers in the text and in chart 1.

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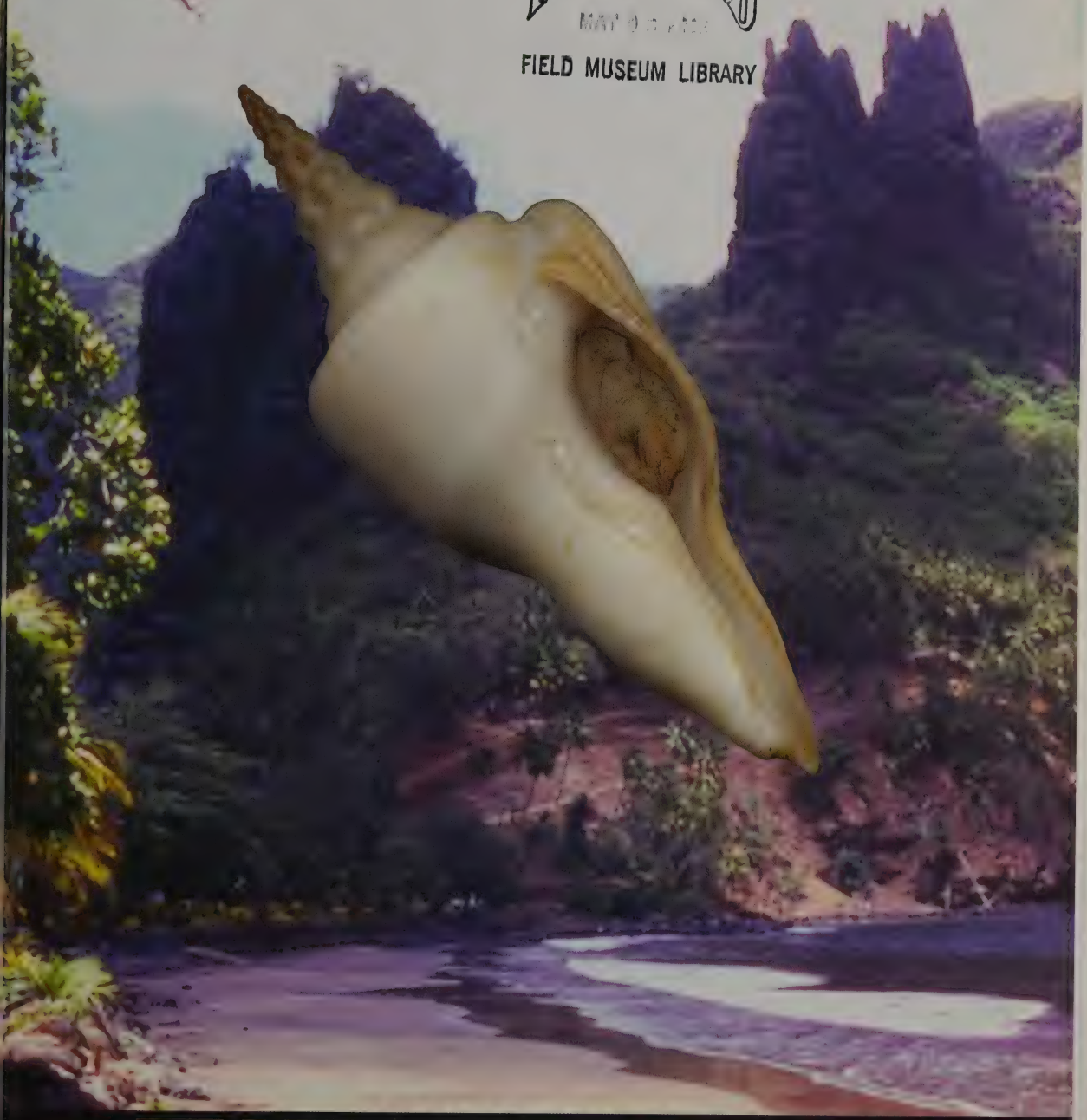

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

Volume 31, No. 1 March 2003

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors – to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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Editor's Notes: Obviously, the big news with this issue is the annual COA convention in Tacoma, Washington (see the story by Tom Rice on page 30). Remember, even if you are unable to attend, you can help COA by donating shells or shell material for the silent and aural auctions. Money raised by this event furthers conchological education and research. COA provides thousands of dollars annually in research grants - mollusk related research that may otherwise not happen. So pick out a nice shell or three and send them to Jim & Linda Brunner, PO Box 8188, Southport, FL 32409 (questions? email LIJI@earthlink.net or call (850) 265-5557. It is tax deductable, a great cause, and it'll make you feel good!

Tom E.

Front Cover: ***Cyrtulus serotinus* Hinds, 1844 and bay beach front on Nuku Hiva Island, Marquesas archipelago by Charlotte M. lloyd, 1999.**

Back Cover: "Shelling Trips Shared" by Teri Marche. Teri is a COA member and a professor of Art History. She and her husband Jordan live in Madison, WI. She gave this painting to Tom Grace to remind him of the many shelling trips they shared.

Diving the Reefs of French Polynesia

By
Charlotte M. Lloyd
Jacksonville Beach, FL

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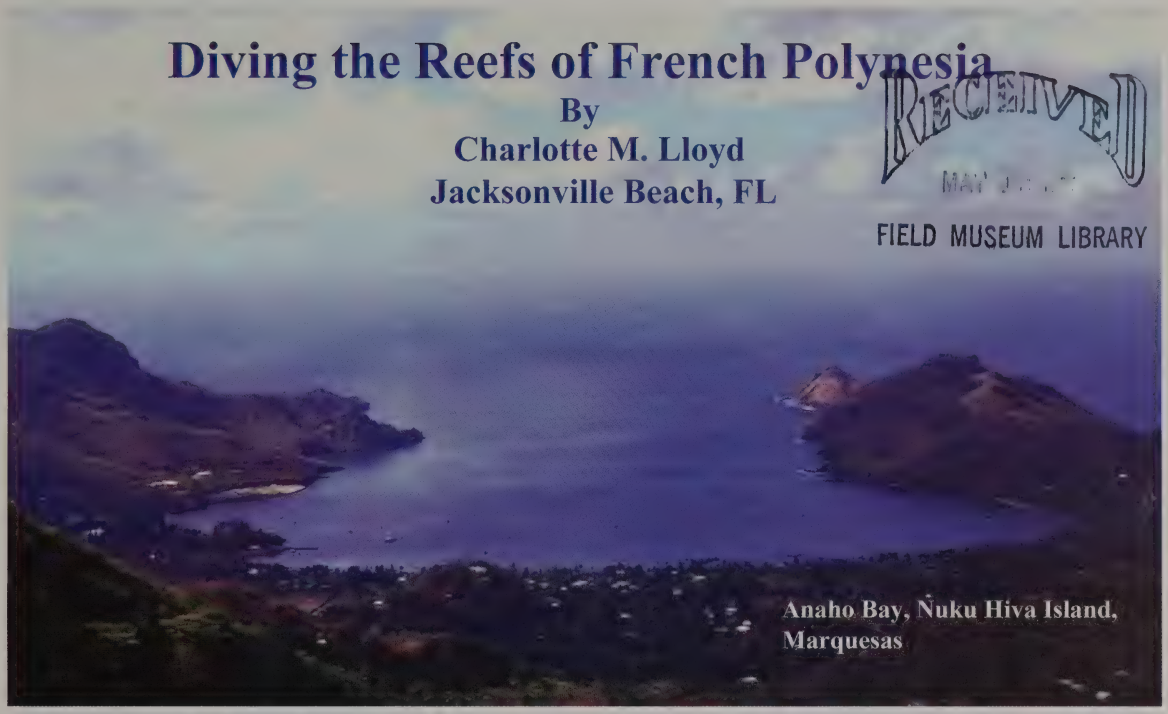


Anaho Bay, Nuku Hiva Island, Marquesas

French Polynesia lies in the heart of the Pacific approximately 3,700 miles from North America. Its one hundred and twenty islands are spread over five archipelagoes. These islands are made up of two different types: high volcanic basalt rock and low coral islands. I was on my way to dive the volcanic island of Nuku Hiva in the Marquesas archipelago. This was my first visit to the tropical islands of French Polynesia and I was really looking forward to the trip. My traveling companions were Wayne Harland and Gene Everson. I would certainly be in good company with these well-known collectors and shell experts. Gene made all the arrangements for the boats, air travel, and other details. Finally October 25, 1999 arrived, and I was on my way.

I met the famous duo at the A.O.M. French Airline counter in Los Angeles, California. After an hour flight delay we boarded the plane at 1:00AM for our eight-hour overnight flight to Papeete, Tahiti. I had hoped to sleep on the plane but as luck would have it a child in the seat behind me coughed and kicked the back of my seat throughout the night. The four-hour flight from Papeete to Nuku Hiva Island was great, and provided wonderful views of the rocky peaks and tranquil bays as we approached the island. A cab driver was waiting and transported us over a dirt road laden with potholes. We bounced across the arid countryside to a bay where our boat Captain awaited us. The gear on to his thirty-foot boat and we headed out to sea. The outside passage to Anaho Bay gave us a glimpse of what to expect in the coming days – seas sometimes 6 feet, no beaches, the island a rugged, jagged abutment of volcanic peaks and valleys with virtually no roads connecting the few tranquil bays.

We were headed for a 60-foot sloop anchored in Anaho Bay, which was to be our home for the next ten days. The bay was calm and very beautiful. It is horseshoe shaped with a dense

Bursa rhodostoma (Sowerby, 1835)
night, 80 feet, Nuku Hiva

Conus moluccensis marielae
Rehder & Wilson, 1975

surrounding tropical forest, coconut palms and a small black sand beach. We would dive from the smaller boat, which had a compressor for pumping tanks. The sloop was very basic, but adequate. The owner Jean Michele and his wife Elizabeth laid down the rules: no salt water below, rinse off with a bucket of fresh water and change your clothes on deck before going below! Oh Great! Wonder where I'm going to set up my aquarium to photograph? After dinner Gene and I couldn't wait and went into the water with nightfall to see what shells might be lurking under the sloop. The bottom was very silty, about 45 feet deep with visibility 6-8 feet. I immediately saw a *Conus vautieri* and lost Gene. I was hooked with my cone sighting and knew I would be down until my air gave out. I managed to find Gene and we spotted *Conus tessulatus*, *Neocancilla granatina*, *Nassarius papillosus* and *N. candens*, and *Natica zonalis* on the silty mud. Eventually we found rocks in about 28 feet of water and saw *Chicoreus maurus* and *Latirus nodatus* with their beautiful purple apertures.

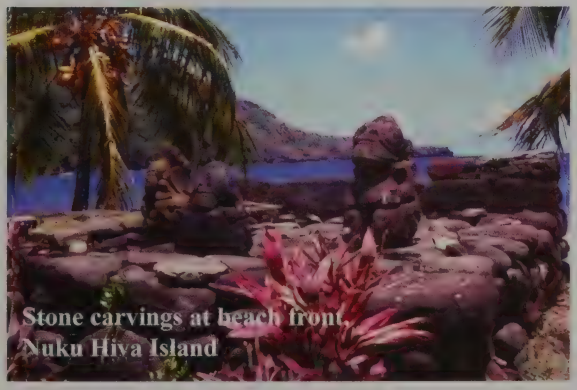
Imagine our surprise the next morning to find that sunrise is 4:30A.M! After a hearty breakfast of coffee, bread and butter, and sliced bananas, we were off for a dive at the mouth of Anaho Bay. The bottom at 90 feet was sand and scattered rocks. Here we saw *Strombus dentatus*, battered *Chicoreus ramosus* and large dead *Cryptopecten pallium*, the royal cloak scallop. Scallop valves were scattered everywhere, but no live shells. I also spotted *Conus sanguinolentus*, and later when I examined the shells, I discover one of them was *Conus moreleti*, which is more slender and lacks the band. At the base of the cliff the seas create quite a surge that can toss shells, and small rocks around – not to mention a diver. This area had an abundance of large spiny sea urchins and it took a lot of energy not to be slammed into the urchins. Back in the boat Wayne shared his discovery of two *Lambis crocata pilsbryi*, an endemic subspecies. He had spotted them in the sand because of their unusual shape.

After lunch we went snorkeling along the rocks in the protected bay. The tropical fish were beautiful and darted in and out of the coral. Hiding in the mossy dead coral and rocks were many small Molluscan species; *Philippia radiata*, *Heliacus variegatus*, *Cypraea moneta*, *Cyp. isabella*, *Cyp. caputserpentis*, *Cyp. maculifera*, *Cerithium echinatum*, *Maculotriton serrialis*, *Engina incarnata*, *Clypeomorus brevis* and several species of *Drupa*. Perhaps the nicest shell from this area was the endemic *Peristernia lirata* that was nestled in the crevices of rocks. For our night dive we decided to go back to the area where Wayne found the *Lambis* because it looked so promising. It was a good decision. We quickly descended to a 115-foot depth (current swept us too deep). But, once oriented we worked our way back up to

Conus marchionatus
Hinds, 1843

Conus bullatus **Linnaeus, 1758**
night, 100 feet, high current

100 feet. The base of the cliff was deeply undercut and with the current pushing you it was easy to suddenly find yourself 30 feet back under the ledge with an unexpected ceiling overhead. Visibility of 25-30 feet did not help matters any. Even with these conditions, we spotted wonderful shells. Wayne, Gene and I observed several *Conus bullatus*. What a thrill to shine my light on the red, pink and cream colored beauties crawling across the sand. I also found a very large dead *Conus marchionatus*. Once home the 58mm shell cleaned up nicely. My two dead taken *Cyrtulus serotinus* were a thrill to find, and I'm sure it is just a matter of time until we see live ones. What a strange looking shell, and the only living species in the genus *Cyrtulus*. Next morning after the same breakfast, we were in the water at 8:30AM on a rocky wall with a cave. Wayne spotted a nice *Cypraea maculifera* and Gene a *Cymatium intermedium*, but we didn't see much else. For the next two days this would be our schedule, dive, snorkel or sightsee during the day and at night make two dives, one in deeper water and one at a slightly shallower depth.



Stone carvings at beach front, Nuku Hiva Island

One night we endured a rough and bouncy hour ride to get to Hakaea Bay. We geared up, jumped in, and when we reached the bottom, we immediately saw live *Cyrtulus serotinus* on the sand along with hermit crab inhabited specimens. I found a dead *Murex thomasi* and a wonderful *Chicoreus ramosus* with long delicate spines. When we returned from our night dive at 10:45PM, the sloop owners were irate because they had expected us back at 9:00PM. (They like to go to bed with the chickens.) I had caught a cold, felt rotten, and was not willing to enter the fracas – I went to bed. In the morning after breakfast of – you guessed it - bananas, coffee and bread; we were told we could stay on the boat if we quit night diving. Since this is what we had come to do, we packed up and left. We decided to stay in town and make the long run through rough seas each night. On the way back to the village we stopped to snorkel in a bay and found thousands of *Nassarius vittatus* right in the surf line. Each wave would pick them up and toss them around in the water column with the animals using their mantles to glide/dive back to the bottom until the next wave, and then they were off again. That night we dove at Hakaea Point again in 90 feet of water on fine sand/gravel. The bottom was literally alive with *Nassarius tabescens*. It was a very productive area and we saw live *Harpa major, Malea pomum,* many *Conus marchionatus*, plus other nice shells.

Thanks to our boat Captain, we were able to hire another sailboat to stay on. It was smaller but much nicer; we could use the overhead lights, sit in the salon to talk to each other, and have appetizing meals. But best of all, I was finally able to do some of

the photography of live shells that I enjoy so much. We were again anchored near the dive sites. That night we dove in 105 feet of water. The bottom was very silty and even the rocks and coral were covered in silt. The *Cyrtulus* must like this condition because they were fairly common. I did see a *Bursa rhodostoma* in a rocky outcropping. What a wonderful experience when each and every shell is new to you. Our second dive was into a coral garden in about 55 feet of water, and it's where I finally discovered the royal cloak scallops living deep inside large colonies of finger coral.

Monday, Nov. 1st, I awake to find my cold is much worse. I don't think I will be able to dive tonight – I miss the best dive of the trip. Both Gene and Wayne find the rare and beautiful *Conus moluccensis marielae*. My consolation is that I get to photograph it. The next day I'm worse, and the Captain has an infected foot. We both visit the local hospital where visits and medication are free. Decongestants, and antibiotics for me and antibiotics for the Captain. We go back to the sailboat and I decide to dive that night because I can't be much worse off. I finally get to the bottom at 85 feet expecting my left eardrum to rupture but surprisingly I complete the dive. The current is running and the lionfish are huddled by rocks. I find a brightly colored fresh dead *Cypraecassis rufa* and *Casmaria erinaceus*.

The next morning the Captain's foot is much worse and surgery is scheduled. Our diving is over. We find rooms at the local hotel and I read and try to recuperate for the next three days. Of course we went on rock turning excursions for intertidal species.

The trip to the airport is a 2 1/2 hour journey over the 4,000-foot high mountain peak. It is 15 degrees cooler as we journey through the rain forest of umbrella ferns, bromeliads, orchids and other tropical foliage. From this lush, damp environment we descend to the rocky, arid, windswept terrain of the airport.

It seemed a shame to come all this way and not visit Tahiti. So Wayne and I got off the plane in Papeete and took a ferry to Moorea Island. We stayed at a beautiful resort with a 5 star restaurant and cabanas right on the beach. We were just steps away from snorkeling among corals, tropical fish, giant sea anemones with clown fish, and many *Tridacna gigas* clams. The *Tridacna* in shallow water were fairly common and from 3 to 16 inches in length. They had beautiful thick green, brown and purple mantles with bright iridescent blue spots. The night snorkeling was wonderful. Giant *Conus leopardus, C. virgo,* and *C. quercinus* could be found in 3-4 feet of water at the swimmers beach. Bright orange and white nudibranchs were on the sand in depressions by the dozens, mating, crawling, and laying strings of eggs. They were everywhere! I was worried about stepping on them in the dark.. *Terebra maculata* and *Mitra mitra* were making trails in the sand by the outer reef. In the shallow water *Conus pulicarius, C. tessulatus,* and *C. flavidus* were very common. We would walk down the beach after dark to enter the warm water, swim out to 15 feet of water and float along with the current enjoying the sights.

This trip was a wonderful experience, and although there were some problems beyond our control, we still managed to see some of the rare and endemic shells that inhabit the Marquesas. Looking back, I was fortunate to experience the best of two worlds, the rocky mountainous beauty of Nuku Hiva Island and the tranquil coral fringing reef of Moorea Island.

Streptopinna saccata (Linnaeus, 1758)

All photographs and scans by Charlotte Lloyd

Some of the seashells found in French Polynesia

1. *Cerithium echinatum* (Lamarck, 1822)
2. *Peristernia lirata* (Pease, 1868) (could be *P. squamosa* (Pease, 1863) with those shoulder spines)
3. *Peristernia ustulatus* (Reeve, 1847)
4. *Drupa ricinus* (Linnaeus, 1758)
5. *Casmaria erinaceus* (Linnaeus, 1758)
6. *Morula uva* (Röding, 1798)
7. *Coralliophila violacea* (Kiener, 1836)
8. *Philippia radiata* (Röding, 1798)
9. *Architectonica perspectiva* (Linnaeus, 1758)
10. *Heliacus variegatus* (Gmelin, 1791)
11. *Maculotriton serriale* (Deshayes in Laborde & Linant, 1834)
12. *Cypraea caputserpentis* Linnaeus, 1758
13. *Cypraea schilderorum* (Iredale, 1939)
14. *Cypraea helvola* Linnaeus, 1758
15. *Cypraea moneta* Linnaeus, 1758
16. *Cypraea obvelata* Lamarck, 1810
17. *Cypraea isabella* Linnaeus, 1758

More Shells From French Polynesia

18. *Conus lepoardus* (Roding, 1798)
19. *Conus virgo* Linnaeus, 1758
20. *Conus quercinus* Lightfoot, 1786
21. *Crytulus serotinus* Hinds, 1844
22. *Malea pomum* (Linnaeus, 1758)
23. *Latirus nodatus* (Gmelin, 1791)
24. *Conus imperialis* Linnaeus, 1758
25. *Terebra maculata* (Linnaeus, 1758)
26. *Cymatium intermedium* (Pease, 1889)
27. *Bursa margaritula* (Deshayes, 1832)
28. *Cymatium nicobaricum* (Röding, 1798)
29. *Bursa rhodostoma* (G. B. Sowerby II, 1835)
30. *Natica zonalis* (Récluz, 1850)
31. *Neocancilla granatina* (Lamarck, 1810)
32. *Cerithium echinatum* (Lamarck, 1822)
33. *Chicoreus maurus* (Broderip, 1833)

Species list from French Polynesia

Cryptopecten pallium (Linnaeus, 1758)
Tellina scobinata Linnaeus, 1758
Trachycardium angulatum (Lamarck, 1822)
Tridacna gigas (Linnaeus, 1758)
Tridacna maxima (Röding, 1798)
Lioconcha hieroglyphica (Conrad, 1837)
Pitar subpellucidus (G. B. Sowerby III, 1851)
Stomatella varia (A. Adams, 1850)
Trochus niloticus Linnaeus, 1767
Nerita polita Linnaeus, 1758
Architectonica perspectiva (Linnaeus, 1758)
Heliacus variegatus (Gmelin, 1791)
Philippia radiata (Röding, 1798)
Cerithium echinatum (Lamarck, 1822)
Rhinoclavis sinensis (Gmelin, 1791)
Clypeomorus brevis (Quoy and Gaimard, 1834)
Sabia conica (Schumacher, 1817)
Strombus dentatus Linnaeus, 1758
Lambis crocata pilsbryi Abbott, 1961
Cypraea caputserpentis Linnaeus, 1758
Cypraea carneola Linnaeus, 1758
Cypraea fimbriata Gmelin, 1791
Cypraea helvola Linnaeus, 1758
Cypraea isabella Linnaeus, 1758
Cypraea maculifera (Schilder, 1932)
Cypraea mauritiana Linnaeus, 1758
Cypraea moneta Linnaeus, 1758
Cypraea obvelata Lamarck, 1810
Cypraea schilderorum (Iredale, 1939)
Natica zonalis (Récluz, 1850)
Cypraecassis rufa (Linnaeus, 1758)
Casmaria erinaceus (Linnaeus, 1758)
Malea pomum (Linnaeus, 1758)
Cymatium intermedium (Pease, 1889)
Cymatium lotorium (Linnaeus, 1758)
Cymatium nicobaricum (Röding, 1798)
Bursa granularis (Röding, 1798)
Bursa margaritula (Deshayes, 1832)
Bursa rhodostoma (G. B. Sowerby II, 1835)
Chicoreus maurus (Broderip, 1833)
Chicoreus ramosus (Linnaeus, 1758)
Chicoreus thomasi (Crosse and Fisher, 1872)
Drupella cornus (Röding, 1798)
Drupella ochrostoma (de Blainville, 1822)
Morula uva (Röding, 1798)
Drupa morum Röding, 1798
Drupa ricinus (Linnaeus, 1758)
Coralliophila violacea (Kiener, 1836)
Cantharus fumosus (Dillwyn, 1817)
Nassarius candens (Hinds, 1844)
Nassarius papillosus (Linnaeus, 1758)
Nassarius vittatus (A. Adams, 1863)
Crytulus serotinus Hinds, 1844
Latirus nodatus (Gmelin, 1791)
Peristernia lirata (Pease, 1868)
Peristernia ustulatus (Reeve, 1847)
Maculotriton serrialis (Deshayes, 1834)
Mitra mitra (Linnaeus, 1758)
Mitra stictica (Link, 1807)
Neocancilla granatina (Lamarck, 1810)
Strigatella pelliserpentis (Reeve, 1844) form *astricta* (Reeve, 1844)
Vexillum pacificum (Reeve, 1845)
Harpa major Röding, 1798
Conus bullatus Linnaeus, 1758
Conus catus Hwass, 1792
Conus encaustus Kiener, 1845
Conus flavidus Lamarck, 1810
Conus ganguini Richard and Salvat, 1973
Conus imperialis Linnaeus, 1758
Conus lepoardus (Röding, 1798)
Conus lividus Hwass, 1792
Conus litteratus Linnaeus, 1758
Conus marchionatus Hinds, 1843
Conus moluccensis marielae Rehder and Wilson, 1975
Conus moreleti Crosse, 1858
Conus planorbis Born, 1778
Conus pulicarius Hwass, 1792
Conus quercinus Lightfoot, 1786
Conus sanguinolentus Quoy and Gaimard, 1834
Conus sponsalis Hwass, 1792
Conus striatus Linnaeus, 1758
Conus tessulatus Born, 1778
Conus textile Linnaeus, 1758 frm *textilinus* Kiener, 1845
Conus vautieri Kiener, 1849
Conus virgo Linnaeus, 1758
Terebra guttata (Röding, 1798)
Terebra maculata (Linnaeus, 1758)
Terebra subulata (Linnaeus, 1758)

1. ***Conus ganguini* Richard & Salvat, 1973**
2. ***Conus bullatus* Linnaeus, 1758**
3. ***Conus marchionatus* Hinds, 1843**
4. ***Conus marchionatus* Hinds, 1843**
5. ***Conus vautieri* Kiener, 1849**
6. ***Conus moreleti* Crosse, 1858**
7. ***Conus sanguinolentus* Quoy & Gaimard, 1834**
8. ***Conus tessulatus* Born, 1778**
9. ***Conus lividus* Hwass, 1792**
10. ***Conus encaustus* Kiener, 1845**
11. ***Conus sponsalis* Hwass, 1792**
12. ***Conus quercinus* Lightfoot, 1786**

COLLECTING TROPHONS IN ARGENTINA — ONE MO' TIME

Emily H. Vokes
Ponchatoula, Louisiana

During the Christmas holidays of 1989/90 and 1990/91 my late husband, Harold, and I spent a total of six weeks in southern Argentina collecting Recent mollusks, chiefly specimens of the muricid subfamily Trophoninae. An account of our adventures appeared in these pages in a series of three articles (Vokes, 1991A, 1991B, 1992). In January of this year I had the pleasure to join Emilio Garcia and a group of fellow shellers in a return to "all the old familiar places" in a sort of sentimental journey, and I was alternately dismayed and delighted by the changes (or lack thereof) I witnessed.

Let's look briefly at our previous collecting sites in the order in which they appeared in the aforementioned articles. Lovely little Ushuaia, "The End of the World," has been discovered —BIG TIME! What was a charming small city of 25,000 inhabitants in 1990 has more than doubled in size and has become the tourist mecca of southern South America. Some 200 cruise ships a year now use this port as a jumping off place for tours to Antarctica. That is 200 ships in a season that lasts no more than 100 days — you do the math. The place is literally crawling with tourists, but it has been a boon to the local economy and fancy new homes are sprouting like mushrooms all over the formerly tree-covered mountain sides flanking the Beagle Channel. One of the principal areas of growth is the watershed of the little Rio Pipo, which formed a small beach where it entered the channel and formerly provided excellent trophon collecting (see Vokes, 1991A). All of this rampant development has put a tremendous amount of sediment into the Rio and the now greatly enlarged, muddy delta is totally barren of shells. Likewise, the "sewage-ridden muck" at the mouth of a small stream to the east of town is now a garbage dump and there are no shells there either.

The same phenomenon occurred at Punta Maria, a rocky point some 10 miles to the south of Rio Grande. Here is the place where, in 1990, I squished around in the mud, slowly turning blue and never locating the source of the wind-rows of dead trophon shells on the adjacent beach. This time our very hardy group (not only was it cold and windy as usual, it was also raining) again scoured the area with no luck, until Emilío went far to the north and finally located a small area where the living animals were concentrated. I do not know if this is some sort of breeding behavior or if they are just chummy.

Visions of live *Adelomelon ferussaci* (Donovan, 1824) lured our group back to Bahia San Sebastian, the amazing bay some 50 miles north of Rio Grande, where low tide exposes miles of sand-flats. Although more intrepid members (I couldn't care less!) combed the flats for hours seeking the elusive volutes, once again only battered beach shells were available. San Sebastian has changed very little since 1990. There is now a gas station/ convenience store, and the Argentine Auto Club has built a nice motel if you are tempted to visit the spot. As for trophons, this is the home of the species I identified as *Xymenopsis albidus*

Exposed flats at Punta Quiroga, low tide, northwest of Golfo San José. Inset shows smooth and ornamented forms of our mystery trophon.

Trophon geversianus from Bahia San Pablo. Opercula (left), egg cases (right).

Trophon sp. from Punta Quirosa. Opercula (left), egg cases (right).

Protoconch of *Trophon geversianus*

Protoconch of mystery *Trophon sp.*

(Philippi, 1846) in 1991A. Since then Pastorino and Harasewych (2000) have made a monumental study of the genus *Xymenopsis* and concluded that the correct name for this species is *X. buccineus* (Lamarck, 1816), so you can go change all your labels.

From Tierra del Fuego, our group flew up to Peninsula Valdés, described in Vokes, 1991B. Happily almost nothing has changed in this wildlife paradise. The Argentine government wisely keeps the few roads unpaved and there are almost no tourist accommodations on the peninsula itself. One of the few exceptions is at Punta Delgada, at what was formerly the naval base at the lighthouse. The lighthouse still functions but the naval installation has been transformed into a delightful small hotel. Even so, "a trip to the beach" means at least an hour drive over gravel roads. On this visit we concentrated our efforts on the shores of Golfo San José, the bay on the northern side of the peninsula. Our goal was to attempt to solve the problem of the mystery trophon collected previously in great numbers at Isla de Pájaros and Playa Larralde, both on the south side of the Golfo. Originally, in 1991A, I indicated that I THOUGHT this species was *Trophon plicatus* (Lightfoot, 1786), but radula studies later disproved that idea, and in 1992 I had to admit I did not know the name for this extremely variable species.

On this trip we not only revisited Playa Larralde, but new roads provided access to localities west of the restricted bird refuge at Isla de Pájaros where we found live, larger specimens similar to those found on the beach at Isla de Párajos (see Vokes, 1991B, figs. 10-13). But the most fabulous locality of all was one that involved a two-hour trip in a four-wheel drive vehicle across the almost trackless desert to Punta Quiroga. Here at the northwest corner of the Golfo San José the specimens were bigger and finer, and even more numerous than on the southern shores of the Golfo.

With all this new material, certainly we should have a better idea of the species – ha! I can tell you that it is extremely variable, ranging from completely smooth, with no spiral or axial ornamentation, to strongly ornamented with spiral grooves/cords and lamellar varices, with every possible permutation in between (see Vokes, 1991, figs. 1-7)

There are shells with strong spirals and no axials, and ones with strong axials and no spirals, the latter being the most common form. In those that have varices, the number varies from 10 to 16, with 12 the most common. The color ranges from dead white to tan to a deep mahogany brown; however, all specimens have a mahogany interior with a white inner lip. The operculum has a series of fine red concentric lines on the inner surface, not seen in *T. geversianus*.

As noted in 1991B, the difference in degree of ornamentation is not a function of sexual dimorphism. There was a whole lot of hanky-panky going on and we saw every combination of smooth and ornamented animals getting it together. But, in general, the usual combination was a small, smooth male "mounting" a large, varicate female. There were lots of egg capsules on the rocks and they are subtly different from those of *T. geversianus*. They are smaller and are scattered over the rock surface rather than being collected on a ribbon.

In 1992, I stated that the radula of the species Calvo (1987, fig. 99; reproduced in Vokes, 1992, fig. 3b) and identified as *T. plicatus* was actually our mystery species; but subsequently, Houart (1998) described Calvo's shell as *Trophon iarae*, and his 75mm specimen clearly is not the Golfo San José species, where the largest specimen I have seen is only 60 mm. So, where does this leave us? Right where we were in 1992. I had hoped that Guido Pastorino,

Mystery trophon egg capsules.

the new guru of Argentine trophons would do something with the Playa Larralde material I provided him in 1991. But a discussion with him on this trip shattered that hope. It is his opinion that these specimens are only an anomalous population of *Trophon geversianus*. There is some merit in what he says. The smooth forms do look just like smooth of *T. geversianus*; the coloration is the same in both; the protoconch is the same (1 ½ bulbous whorls); and the radulae are the same (cf. Vokes, 1992, fig. 1c, 1d, and 3c, 3d).

But in my heart I simply cannot accept this identification. The varicate form just does not look like any *T. geversianus* I have ever seen. And the warmer water must play some role in the separation of the species. This is a work still in progress, and with luck someone will solve it in my lifetime. In the meantime, southern Argentina remains one of the most beautiful and interesting mollusk collecting areas in the world (assuming you want trophons). I cannot praise too highly the wonderful people, the scenery, the wildlife, the food, and the tremendous tides that permit collecting "deep-water" shell almost dry-shod.

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Three Argentine Portraits

by

Emilio García

During a recent collecting trip to magnificent Argentina (see Emily Vokes's article), I and a few other collectors had the opportunity to visit a remote area on the northeastern side of Golfo San José, Península Valdés. The area was a combination of rocky reef and small sandy beaches. During low tide there were innumerable tracks in the sand, the majority of which produced *Buccinanops globulosus* (Kiener, 1834). A nice enough find, but, Dr. A. B. Osborn, of Elizabeth, Louisiana, was fortunate enough to find a specimen with newly hatched babies (fig. 1.). The white areas are their nepionic whorls, while the dark brown is the first teleoconch whorl. The genus *Buccinanops* belongs to the family Nassariidae, which has many species that have proven to be ovoviviparous.

On the same beach, while inspecting the telltale trails in the exposed sand inhabited by the prolific *Buccinanops*, I noticed a track that was rather unusual because of its length. I was not hopeful, but one always tries. I certainly was not ready for the live *Odontocymbiola subnodosa* (Leach, 1814) that I dug out (Fig.2). This species is not supposed to be intertidal. Poppe and Goto (1992) place it at 70 to 180 m deep!

It seems that each collector has his/her own collecting methods, and different methods often produce different species. Most of us can't wait to run to the farthest exposed areas, because there the grass is greener or something. But not our Shary Almasi, from Seattle, Washington. She calmly walks to the place where her *Extra Sensory Perception* tells her that she can find some of the beautiful micromollusks that she loves, and then she searches and searches. That is how she found most of the *Epitonium fabrizioi* Pastorino & Penchaszadeh, 1998 collected on this trip, including several specimens on this same beach. The anemones on which the species feed inhabit the rocky reefs, so she goes there, looks for anemones that have some sand around them, and then softly, carefully, lovingly, she starts digging around the base of the anemone where she often digs out a specimen or two. Although I found the specimen in the picture (Fig. 3.), I am one of those who runs to the greener pastures. I forced myself to take the time to find this specimen. It was a matter of honor.

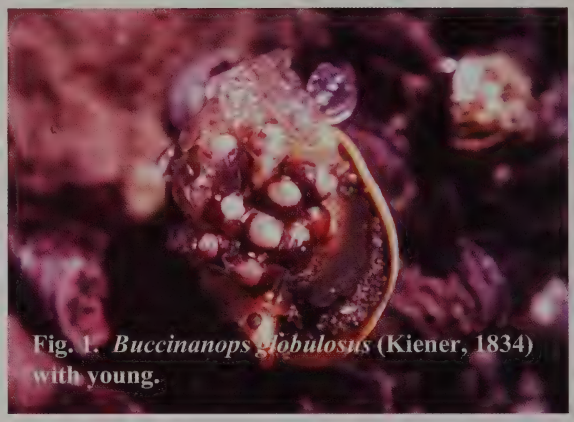

Fig. 1. *Buccinanops globulosus* (Kiener, 1834) with young.

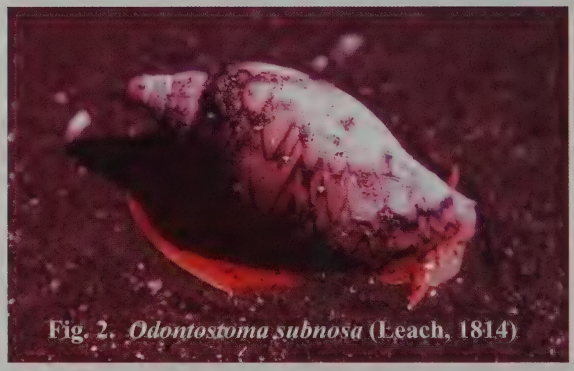

Fig. 2. *Odontostoma subnosa* (Leach, 1814)

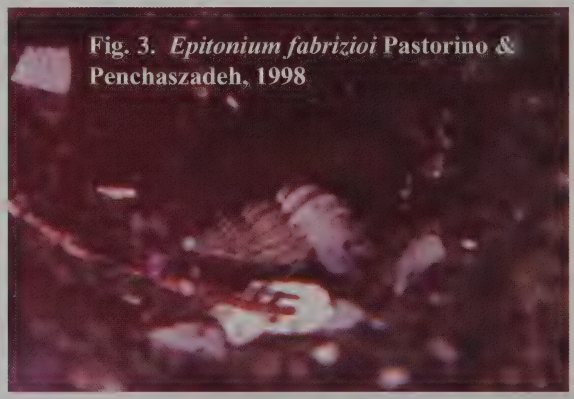

Fig. 3. *Epitonium fabrizioi* Pastorino & Penchaszadeh, 1998

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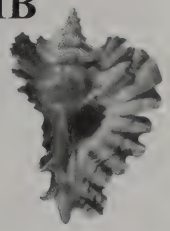

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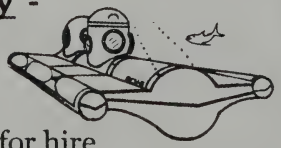

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Donations for COA 2003

DONATIONS NEEDED FOR 2003 COA AUCTION

The annual gathering of the COA clan is fast approaching. This year the visit is to the Sheraton Hotel in Tacoma, Washington from 17-21 July. Two of the major highlights of this, or any convention, are the oral and silent auctions. These are the primary vehicles used to fund the COA Research Grants Program. And they are entirely dependent on your generosity. All donations are tax deductible, you will receive an appropriate receipt by return mail. To give us time to sort, catalog, package, etc. we need to receive your donations by 5 May 2003 (but earlier is better!). The mailing address is Jim & Linda Brunner, PO Box 8188, Southport, FL 32409. When you send your gems send us e-mail at LIJI@earthlink.net so we can be on the lookout for them. Use the same address for any questions you have or call us at (850) 265-5557.

American Malacological Society

The 69th Annual Meeting of the American Malacological Society will be held at the University of Michigan during June 25-29th 2003. I hope you can join us for what promises to be an exciting conference with a comprehensive coverage of both marine and non-marine malacofaunas.

Please access (and bookmark) our meeting webpage http://www.ummz.lsa.umich.edu/mollusks/ams/ and activate the EVENTS link (on left) to obtain an overview of the current schedule, including 2 symposia, 2 special sessions, Field Trips, Endowment Auction and Show Shell & Tell sessions. Other links contain information on accommodation options and on Ann Arbor and its environs.

We are currently working on the AMS 2003 Registration Form and it will be available shortly. In the meantime, the Papers and Posters submission form is available as a pdf: click on the "DOWNLOAD FORMS AND GUIDELINES" link toward the bottom of the coverpage.

The deadline for both registration and paper/poster submission is MAY 1st 2003 (details in Endowment Auction Information and Submission pdf).

Jordan Star's Web Picks

★= poor, ★★= fair, ★★★= good, ★★★★= excellent, ★★★★★= outstanding.

★★★★★-Seashells.Org, http://www.seashells.org/. Guide to seashells, sea life, beachcombing, identification, & cleaning and preserving. Good links for general shell collecting information and non-shell critters. A great starting place for beginners.

★★★★★-Jacksonville Shell Club Home Page, http://www.jaxshells.org/. I've been to this excellent site before, but it constantly grows and improves. Many links, lots of pictures, much info. Well organized, a site map and search engine are most welcome.

★★★★★-Sea Shells, http://www.gastropods.com/index.html. Not a shell dealer or club but an individual who put his shell collection on the web. Good pictures, lots of pages, and shells described. Links to other sites and a book list.

★★★★-Live Seashell Gallery, http://www.geocities.com/~sangioul/ind.html. A Conch-L member, nice pictures of live shells from different collecting locales and shells ready for a collection. Can buy shells. A link to shell screen savers.

★★★-Beachcombers' Alert! http://beachcombers.org/. A newsletter on the ocean and beaches run by an oceanographer. Photos and information on the state of the sea and what is washed up on the beach, mostly reported by individuals. Good educational site.

Links good/work as of 2-24-03

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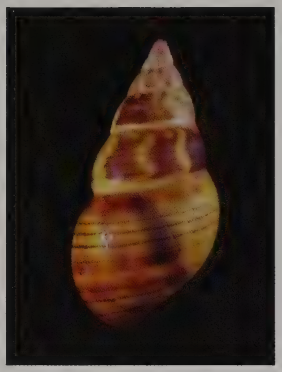
Liguus fasciatus (Müller, 1774) of South Florida* — part two (part one was vol. 29, no. 3)

by Kevan & Linda Sunderland

L.f. capensis Simpson, 1920
63 mm



L.f. castaneus Simpson, 1920
60 mm

L.f. deckerti Clench, 1935
57 mm

L.f. delicatus Simpson, 1920
61 mm

L.f. dohertyi Pflueger, 1934
50 mm

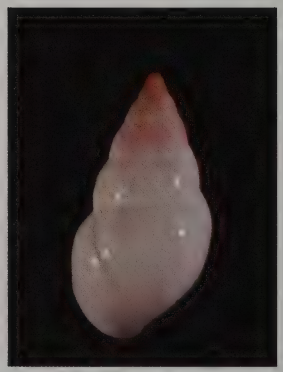
L.f. dryas Pilsbry, 1932
50 mm

L.f. eburneus Simpson, 1920
44 mm

L.f. elliottensis Pilsbry, 1912
53 mm

L.f. evergladesensis Jones,
1979 - 46 mm

L.f. innominatus Pilsbry,
1930 - 50 mm



L.f. lineolatus Simpson, 1920
46 mm

L.f. livingstoni Simpson,
1920 - 52 mm

L.f. lucidovarius Doe, 1937
52 mm

L.f. luteus Simpson, 1920
45 mm

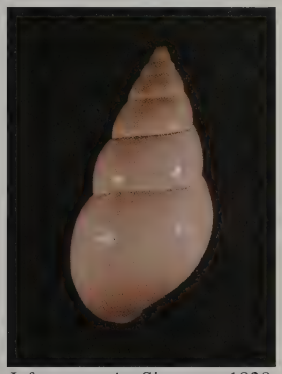
L.f. nebulosus Doe, 1937
37 mm

L.f. osmenti Clench, 1942
53 mm

L.f. pictus Reeve, 1842
52 mm

L.f. septentrionalis Pilsbry, 1912 - 48 mm

L.f. subcrenatus Pilsbry, 1912
52 mm



L.f. vacaensis Simpson, 1920
57 mm

L.f. violafumosus Doe, 1937
41 mm

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* An index to the "centerfold" series is online: http://data.acnatsci.org/conchnet/Centerfold4.html

Kevan & Linda Sunderland, 9370 NW 39th Street, Sunrice, FL 33351 email: KLShells@mindspring.com

SCUM VII: Southern California Unified Malacologists

by Lindsey T. Groves
Natural History Museum of Los Angeles County, Malacology Section, 900 Exposition Blvd., Los Angeles, CA 90007
<lgroves@nhm.org>

Thirty-two professional, amateur, and student malacologists and paleontologists attended the 7th annual gathering of Southern California Unified Malacologists (SCUM) in the Heritage Room of the Laguna Hills Community Center, Laguna Hills, California, on Saturday, January 25, 2003. This informal group continues to meet on an annual basis to facilitate contact and keep members informed of research activities and opportunities. In keeping these gatherings informal, there are no dues, officers, or publications. It is hoped that the continuing success of informal groups such as SCUM, Bay Area Malacologists (BAM), and Mid-Atlantic Malacologists (MAM) will encourage other regional groups of malacologists and paleontologists to meet in a likewise manner.

SCUM VII was hosted by Carol Stadum, who welcomed the group and updated everyone on recent happenings and upcoming meetings. Carol spent several years as a consultant to the city of Laguna Hills designing a prehistoric playground, a fossil waterfall, and the fossil displays in the community center. She has also been a driving force in the area for the preservation and protection of the few remaining outcrops of local Miocene fossil reefs (after the proceedings Carol treated several of us to a personally guided tour of these preserved areas). SCUM attendees were given the opportunity to present current mollusk related research and/or activities. Numerous discussions and comments resulted from many of the presentations. A special exhibit entitled *Beyond Light* featured the "Art of X-rayography" by Albert Koetsier, which focused on various invertebrates and plants, many of which were offered for sale. Also on exhibit were several examples of squid from the mass strandings last summer along the beaches of La Jolla, California. SCUM VIII will be hosted by Ron Velarde of the City of San Diego, Marine Biology Lab, in January 2004.

SCUM VII participants and their respective interests and activities:

Yvonne Albi (Conch. Club So. Calif.): Currently researching extinct "reef-building" rudist bivalves, particularly *Coraliochama orcutti* from the Late Cretaceous Rosario Formation of northern Baja California, México.

Kelvin Barwick (City of San Diego): Continues his studies of benthic and epibenthic samples from 30 to 600 feet (particularly limid bivalves) from Del Mar, San Diego Co., California, to Tijuana, Baja California, México, particularly near sewer outflalls.

Matt Doi (Pacific Shell Club): Interest in Hawaiian shells and Pliocene/Pleistocene mollusks of Florida.

Pat Don Vito (San Diego Nat. Hist. Mus.): Volunteer in the Invertebrate Paleontology department.

Doug Eernisse (Calif. St. Univ., Fullerton): Continues worldwide chiton database with images and chiton phylogenetics, particularly the *Tonicella lineata/loki* lineage.

Wes Farmer (San Diego, California): Continues photo essay of Torrey Pines State Park fossil outcrops.

Judith Garfield (La Jolla, California): Science writer and illustrator with interest in California coastal issues that involve mollusks. Presented slides of spawning deep water squid.

Daniel Geiger (Santa Barbara Mus. Nat. Hist.): Continues research on scissurellid and fissurellid gastropod phylogeny. Has begun abalone morphometrics project with University of Southern California undergraduate student Shalini Mohan.

Lance Gilbertson (Orange Coast College): Now retired from teaching duties but continues research on urocoptid and helminthoglyptid land snails from the southwest United States.

Lindsey Groves (Nat. Hist. Mus. L.A. Co.): Fossil cowry research continues including a new species of *Zonaria* from Chile, new Cretaceous species from California, and new species of *Eocypraea* from the Pacific slope. Continues with the companion volume to Keen & Bentson's (1944) *Check List of California Tertiary Marine Mollusca*.

Carole Hertz (San Diego Shell Club): Continues as editor of *The Festivus* (San Diego Shell Club publication). Included display of *Festivus* supplements for sale.

Jules Hertz (San Diego Shell Club): Continues as Business Manager for *The Festivus*.

Seth Jones (San Diego, California): Interest in benthic marine mollusks.

George Kennedy (Brian F. Smith & Assoc., Poway, CA): Continues his research of Pleistocene marine terraces of California.

Kathy Kalohi (Pacific Shell Club): Interested in wreck diving, fossil mollusks, and land snails.

Phil Liff-Grief (Pacific Shell Club): Phil reported on a recent trip to Kauai, Hawaii, to collect fossil landsnails from lithified and non-lithifed deposits and talus slopes. Of particular interest was the first record of the genus *Newcombia* north of Maui and Molokai.

Larry Lovell (Scripps Inst. Oceanog., La Jolla, California): Despite recent budgetary cuts, continues as Benthic Invertebrates Collection Manager. Continues research of invertebrates from Deception Island, Antarctica, with Kent Trego.

John Ljubenkov (Pauma Valley, California): Independent consultant.

Jim McLean (Nat. Hist. Mus. L.A. Co.): Jim continues work on his eagerly anticipated volumes on North Pacific shelled gastropods with monetary help from the Packard Foundation.

Chris Plouffe (San Diego, California): Currently interested in researching fossil mollusks at the graduate level.

Chuck Powell (US Geological Survey): Continues with research of Neogene and Quaternary mollusks in deposits of the Los Angeles Basin, California.

Bill Power (Los Angeles Co. Sanitation District): Continues with benthic infaunal sampling program from 45 to 1000 ft. depths off southern California.

Scott Rugh (San Diego Nat. Hist. Mus.): Currently researching buried Holocene deposits redistributed by storm activities and cool-water mollusks from middle "San Pedro Formation" in the Coyote Hills, Orange County, California.

LouElla Saul (Nat. Hist. Mus. L.A. Co.): Continues research of Cretaceous mollusks with Richard Squires and Miocene argonauts with Carol Stadum. She also continues on a long awaited volume on the invertebrates of the Miocene Topanga Formation.

Nancy & Bill Schneider (San Diego Shell Club): Continue collecting Pliocene and Pleistocene fossils from Baja California, México. Exhibited material from Santa Rosalia, Baja California, México.

Roger Seapy (Calif. State Univ., Fullerton): Continues with heteropod research.

Carol Stadum (Carlsbad, California): Continues Miocene argonaut research with LouElla Saul.

Bob Stanton (Nat. Hist. Mus. L.A. Co.): Presented data on the Pliocene molluscan record from Cape Blanco, Oregon to San Diego, California (732 localities) particularly the number of samples vs. numbers of species.

Mary Stecheson (Calif. State Univ., Northridge): Continues thesis research on Cretaceous mollusks of the Chatsworth Formation in the Simi Hills, Los Angeles and Ventura counties, California.

Kent Trego (San Diego Shell Club): Continues research activities on Deception Island, Antarctica, with Larry Lovell.

Ron Velarde (City of San Diego): Continues offshore monitoring projects of benthic invertebrates from 10 to 200 meters, between Pt. Conception, Santa Barbara Co., California, to the Mexican border. Of particular interest is the importance of nonindiginous species in southern California embayments.

SCUM Members from Left to Right

FRONT ROW (diagonal): Yvonne Albi, Judith Garfield, Carol Stadum, Kathy Kalohi, and Roger Seapy.

SECOND ROW: Ron Velarde, Jim McLean, LouElla Saul, and Larry Lovell.

THIRD ROW: John Ljubenkov, Matt Doi, and Scott Rugh.

FOURTH ROW: Lance Gilbertson and Phil Liff-Grieff.

FIFTH ROW: Kelvin Barwick, Carole Hertz, Nancy Schneider, Bob Stanton and Chuck Powell.

TOP ROW: Daniel Geiger, Bill Schneider, Seth Jones, Lindsey Groves, Doug Eernisse, Bill Power, Mary Stecheson, and George Kennedy.

SCUM members attending meeting but not in photo: Pat Don Vito, Wes Farmer, Jules Hertz, Chris Plouffe, and Kent Trego.

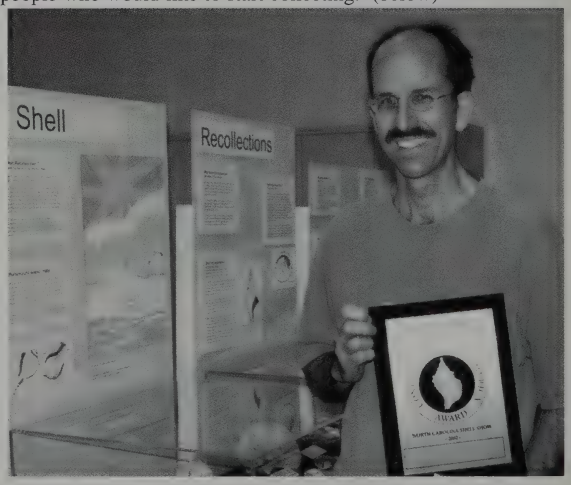
Award Winners

Harry Berryman is pictured with his COA Award at the Sarasota Show on February 7-9. Harry's exhibit "Xenophora and their Three Shell Forms" housed a complete collection of Xenophoras with plenty of information and photos on this interesting family. Good Job, Harry! (above)

At the Sanibel Shell Show in March 6-8, 2002, Peggy Williams took home the coveted COA Award with her 17-foot exhibit "Beyond the Beach." Peggy's display showed the many different ways and places to collect shells. (below)

On November 2-3 of 2002 Harry & Lillian Berryman again won the COA at the Philadelphia Shell Show with "Worldwide Cassidae." This worldwide exhibit of the family included most major species. Our congratulations to the Berryman's for their double win in 2002. (above)

COA member John Timmerman was awarded the COA Trophy at the North Carolina Shell show on September 13-15, 2002. John's exhibit "Shell Recollections" explored his beginnings as a shell collector. It covered the years of his youth and included stories about acquiring shells from family, friends and vacations. This very original and special exhibit would inspire people who would like to start collecting. (below)



Gene Everson had 5 major wins at the Astronaut Trail Shell Show on January 18-19 of this year. This veteran collector showed "Self Collected Shells of the Central and Tropical Western Pacific" which won the COA and Tucker Abbott Award and Self-Collected Shell-of-the-Show. The exhibit included many world record specimens from 11 countries. His "Shells of Australia" won the duPont, and Shell-of-the-Show in Any Manner. WOW! (above and below)

The Award Winners page is written by Charlotte Lloyd (COA Trustee) and the plaques are ordered, purchased, and shipped by Donald Dan (COA Trophy Chairman). Contact information is on page 2.

Review by Zvi Orlin (Motzkin, Israel) of
Checklist of the Recent Mollusca from the New Zealand Exclusive Economic Zone
By
H.G. Spencer, R.C. Willan, B.A. Marshall, & T.J. Murray, 2002

I have always had a special affinity for New Zealand; from my detailed geography studies in high school, to meeting Kiwis (as the New Zealand soldiers were called) during my service in Egypt during WWII, and reaching full fruition during two weeks I spent traveling the North and South Islands in 1983. I became enamored with the scenery and truly impressed by the friendly, outgoing people. I recently established contact with members of the Wellington Shell Club and, becoming a member, began exchanging shells with club members. I also started acquiring suitable literature to assist in my attempts at classification and identification of New Zealand molluscs. The basic tool I used was Powell's *Mollusca of New Zealand* (1979) that was updated by Spencer and Willan in *Index to the Fauna: 3. Mollusca* (1996). It also includes terrestrial and freshwater species.

This checklist covers Recent molluscs from the New Zealand Exclusive Economic Zone (E.E.Z.), to include North and South Islands, adjacent Stewart, Chatham, and smaller islands, and Kermadec Islands. Certain species were excluded because very few specimens were found and there may not be a breeding population present. Within the systematic list the designation of each family is followed by subfamily, genus, subgenus (where applicable), and species. In all, 2,902 species and subspecies are listed. Each species is substantiated by bibliographical reference(s) (website: http://toroa.otago.ac.nz/pubs/spencer/Molluscs/) and an approximate geographical range. Adventive or introduced species are indicated, but the most significant addition for me was the inclusion of **endemism**. I regard range and endemism as critical in understanding the distribution of species.

I conducted a count and found a phenomenal 76% of the marine molluscs listed were endemic. This may be the highest percentage of endemism in the world for such a large region. New Zealand has been known for a high percentage of molluscan endemism due largely to its relative isolation for millions of years following the breakup of Gondwana. But the exact extent was not known until this tally and will probably come as a surprise to many conchologists. When I consulted one of the authors on the reliability of my numbers, I was told they had come up with an even higher percentage because they included undescribed taxa. He stated they had over 1,000 species awaiting formal description and naming. The list mentions the last update was on 3/12/2002 and the last modification on 6/18/2002.

These are some of the families represented in New Zealand by an endemic population. The number in parenthesis is the number of species.

Glycymerididae (2), Spondylidae (2), Thyasiridae (7), Ungulinidae (5), Carditidae (11), Cuspidariidae (15), Thraciidae (5), Dentaliidae (5), Lottiidae (17), Acmaeidae (3), Cocculinidae (5), Lepetellidae (5), Haliotidae (6), Turritellidae (15), Vermetidae (5), Siliquariidae (3), Struthiolariidae (6), Xenophoridae (2), Calyptraeidae (9), Typhidae (5), Olividae (9), Cancellariidae (12), Retusidae (8)

Included with these endemic families are many microshell families. There are also a number of families where 90% of the species are endemic. Many of these families are microshells, and because the collection and study of microshells is still in its infancy, the numbers will undoubtedly change. However, the numbers of synonyms withdrawn from the list will almost certainly be balanced by newly described taxa.

The authors should be congratulated on an outstanding publication. They have published an apt record of the biodiversity of this crossroads between the Pacific and Southern Oceans. I look forward to future updates and newly named and described taxa. Hopefully this checklist and others, like the checklist on Red Sea molluscs by myself and Henk Dekker of Holland (2002), will be the start of similar checklists from other countries bordering the world's oceans. Such checklists add an important, even critical, aspect to understanding the world's biodiversity. (Ed note: The last issue of American Conchologist had just such a list prepared by E.F García and H.G. Lee on molluscan species found off the coast of Louisiana. An update of this list is in the current issue as well as color images of numerous species)

Conchologists of America, Inc.
2003 Convention

Sheraton Hotel, Tacoma, Washington
July 17 - 21, 2003

Hosted by The Pacific Northwest Shell Club, Inc.
& Of Sea and Shore Publications

"Shells Will Be Reigning on Puget Sound"

A Sheller's Journey to the White House

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The journey to the White House is a long one! I first discovered seashells during a family vacation to Sanibel Island, Florida, in 1976. As a textile consultant, the colors, patterns, and structure were intriguing and quickly incorporated into seashell art. When I arrived home I began trimming mirrors and making angels – very much enjoying my new found passion for shell art and craft. In the fall of 1977 my husband Gary and I joined the Minnesota Society of Conchologists. Marilee McNeilus of Dodge Center, Minnesota, joined about the same time and we became friends and coworkers in shell art. I continued my work in textiles and teaching at various colleges – but "The Spell of the Shell" had been born.

In 1980 I was accepted into the Minnesota Renaissance Festival, beginning a 20+ year career with a family shell shop. This same year, Marilee and I went on our first shelling expedition, with Kirk Anders to Puerto Rico, and we attended our first COA convention, in Key West, Florida. I soon found myself conducting charter shelling trips to Sanibel Island and then to Eleuthera in the Bahamas. In addition to active shelling, I helped clean several beaches. The plastic and metal trash became "environmental impact statements," - large collages, two or three feet on a side. These were exhibited at different shows. One was entitled "Our Beloved American Shores (Look What We've Done to Ourselves)" and another was "The Sanibel Stoop-id." Hopefully, some got the message.

In 1985 I began a 17-year tradition that continues to today – annual shell collecting and beachcombing trips to Baja, Mexico. These, too, soon became group sessions and on various trips we were able to see and hear female and baby gray whales. It makes for a thrilling adventure to sit on a small boat, a panga, while these huge, graceful creatures come alongside to have a look. Some stayed for as long as 45 minutes. Also on one of these trips we helped a famous Mexican artist construct an earth-art design of a gray whale using shells (discards from the shell dumps) in a design that covered the area of a football field.

I continued to work with shells and my creations of tree ornaments, angels, jewelry, candles, mirrors, collages, wreaths, sand casting, etc. were sold in stores from Key West to Jersey City and California to Hawaii. I attended numerous shell shows and continued searching for new beaches and locales to display my shell art. One such beach was off the coast of Norway, above the Arctic Circle, in winter! My husband was a consultant to the Royal Norwegian Air Force and we spent two weeks at this remote location – never seeing the sun. The best light was a sort of twilight – but it was enough to walk the beach. As the waves would come in off the open sea and then recede, they would leave a sheet of ice across the sand. This ice had to be broken every time I spotted a likely shell. I also ended up in St. Petersburg, Russia, in 1997 at the Palace of Friendship. My shell art was new to the people of this country and my display made the front page of the newspaper and well as being filmed

(Above) Ruth in her Minnesota studio with the White House shell ornaments ready to ship. (Below) Ruth at the Louisville COA convention with her ornaments in a display by Terry Davis.

by all three television stations. Between the shell displays and our work with children at a small prison and a farm commune, there was still time for shell collecting. It was a wonderful trip and we plan on going back soon.

But none of this is getting me to the White House. That actually began in 1985 when the Smithsonian Institution issued a call for tree ornaments for 12 Christmas trees. I auditioned my seashell ornaments and was chosen as one of the winners of the "Trees of Christmas" exhibition for 1985. My entry was a five-foot tree entitled "Christmas at the Beach." The ornaments included wreaths of miniature shells, many types of angels, sea stars, a fishnet garland, and small wooden trees from Germany – each separately decorated. These miniature trees proved to be a very popular item in following years. Of course, assisting me through all of this was my friend Marilee.

During our nation's bicentennial I again submitted some ideas for a shell-decorated tree and was selected to design and decorate the tree that stood at the door of the Smithsonian! This was quite an honor – but the tree was 10 feet tall! So with Marilee McNeilus and lots of help from volunteers from the Minnesota Society of Conchologists, we got to work making ornaments. Several of us went to Washington, D.C., to decorate the tree and we were treated to receptions and tours – one of which was at the White House.

The White House tour started me thinking and in 1992 I called the White House and inquired about providing some shells for the White House Christmas tree. They said they would be interested and I sent two 24 x 14 inch trays of shell ornaments. They arrived safely and were set aside for future use. For the next nine years I would call once or twice a year to remind them they had the ornaments in storage and to see if they were to be used that year. No luck.

In the fall of 1998 I flew to Washington to meet with a White House spokesperson. I had examples of new designs and again they were most favorably received. But nothing showed up on the Christmas tree. Finally in 2001 I got the call! But instead of telling me my ornaments would finally be used, they informed me the trays had been lost! I was asked to submit some more ornaments, this time for a tree entitled "snowflakes."

I got right to work planning the upcoming tour and making ornaments. But the tragedy of 911 changed things a bit. There would be no tours. I was instructed to ship the ornaments to arrive by November 1st and to include a photograph of the package contents on the outside of the box for security purposes. I did all of this and off went the ornaments the first week of October. I wanted to see my ornaments on the tree and called (and wrote) to check on this possibility. What I found out was the ornaments had not been delivered due to the anthrax scare. Once they did arrive I received a call from the White House saying "Be absolutely sure you know these ornaments are government property!" Of course, I just wanted to see them used on the tree! No tours, but they did inform me of a television program on the White House decorations and the entire Reetz family gathered around the television set that night to see the ornaments hung on the tree behind the program's host. Not quite what I had envisioned.

Then on the 12th of January 2002, a package of photographs arrived from the White House. Inside were several 8 x 10 color images of my ornaments on the White House tree and even some nice close ups. It was the next best thing to being there.

Report on molluscan species found in the offshore waters of Louisiana, including many extensions of known range and un-named species II.

by

E. F. García and H. G. Lee

In the December issue of *American Conchologist* (García & Lee, 2002), there appeared a report on 385 species collected in offshore Louisiana waters. This is a pictorial suplement to that report. A number of the species included in the previous list have already appeared elsewhere (see References). We have opted to include here, with a few exceptions, taxa that represent important geographical extensions or taxa that seem to be undescribed. All of the specimens photographed were collected in offshore Louisiana waters. We did not try to improve on the quality of the specimens by photographing extraneous material.

Some of the taxa are represented by only one specimen. However, the special submarine topography of the area, composed in places of "pinnacles" that serve the purpose of islands in a sea of soft mud, as described in earlier publications, supports the notion that these single specimens could not have come from elsewhere.

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CORRECTION

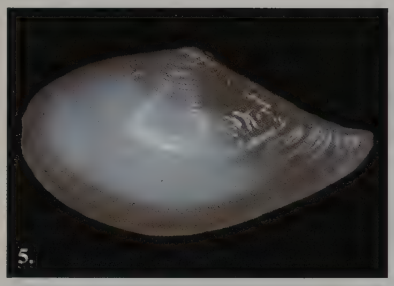
Since publication of the last issue there have been a few updates and changes to the list:

139. **Folinia* *motezzi* (Bavay, 1917) is now
139. *Folinia* cf. *motezzi* (Bavay, 1917)
142. **Rissoina vanderspoeli* de Jong & Coomans, 1988 is now
142. *Phosinella fenestrata* (Schwartz, 1860)
143. *Phosinella fenestrata* (Schwartz, 1860) is now
143. *Phosinella sagraiana* (d'Orbigny, 1842)
144. *Phosinella sagraiana* (d'Orbigny, 1842) is now
144. **Schwartziella* cf. *floridana* (Olsson & Harbison, 1953)

The numbers correspond to the numbers used in vol. 30, no. 4 and may differ from those online at: http://www.jaxshells.org/. As before, the asterisk indicates a new record.

5.* *Nuculana verrilliana* (Dall, 1886) - 6.3 mm
6.* *Nuculana vitrea cerata* authors non (Dall, 1881) - 4.1 mm
45. *Lucinoma filosa* (Stimpson, 1841) - 14 mm
62. *Macoma pulleyi* F.M. Bayer, 1969 - 47.7 mm
71. *Neolepton* species [apparently unnamed] - 2.9 mm
95. *Laevidentalium* species - 17.7 mm
96. *Platyschides* cf. *arctus* (Henderson, 1920) - 10 mm
97. *Platyschides bushii* (Dall, 1889) - 9mm
101.* *Haliotis poutalesii* Dall, 1881 - 17.8 mm
106.* *Emarginula pumila* (A. Adams, 1852) - 5 mm
111. *Lucapina adspersa* Philippi, 1845 - 10 mm
122.* *Lamellitrochus* species - 4 mm
139.* *Folinia* cf. *motezzi* (Bavay, 1917) - 4.2 mm
143. *Phosinella sagraiana* (d'Orbigny, 1842) - 9 mm
148.* *Teinostoma cocolitoris* Pilsbry and McGinty, 1945 - 2.2 mm
151.* *Vitrinorbis* cf. *callistus* (Pilsbry and Olsson, 1945) - 3 mm
162. *Primovula vanhyningi* (M. Smith, 1940) - 10 mm
171.* *Natica menkeana castrensis* Dall, 1889 - 15.5 mm
183.* *Cerithiopsis albovittata* (C. B. Adams, 1850) - 2.3 mm
185.* *Cerithiopsis fusiformis* (C. B. Adams, 1850) - 2.9 mm
186.* *Cerithiopsis* cf. *ophiura* Olsson and Harbison, 1953 - 2.7 mm
187.* *Cerithiopsis* cf. *warmkae* de Jong and Coomans, 1988 - 3.7 mm
190.* *Horologica pupa* (Dall and Simpson, 1901) - 3 mm
193.* *Cosmotriphora arnoldoi* Faber & Moolenbeck, 1991 - 4 mm
194.* *Cosmotriphora melanura* (C. B. Adams, 1850) - 6.5 mm
196.* *Inella* cf. *triserialis* (Dall, 1881) - 6.2 mm
198.* *Mesophora novem* (Nowell-Usticke, 1969) - 3 mm
200.* *Metaxia excelsa* Faber and Moolenbeek, 1991 - 1.3 mm
201. *Metaxia rugulosa* (C. B. Adams, 1850) - 3.1mm
202.* *Monophorus ornatus* authors non (Deshayes, 1832) - 3.5 mm
205.* "*Triphora*" *dupliniana* Olsson, 1916 - 4.1 mm
206.* "*Triphora*" *elvirae* de Jong and Coomans, 1988 - 3.4 mm
207. "*Triphora*" *lilacina* Abbott, 1974 non (Dall, 1889) - 4 mm
209.* "*Triphora*" species 1 - 4.8 mm
215. *Epitonium echinaticostum* (d'Orbigny, 1842) - 5.7 mm
224.* *Eulima* sp. aff. *fulvocincta* C. B. Adams, 1850 [nearly identical to *E. f.*, but the protoconch and early teleo- are massive] - 3 mm
225.* *Melanella gibba* sensu Abbott, 1974 non de Folin, 1867 - 3.5 mm
244.* *Hirtomurex* cf. *longicauda* (Settepassi, 1971) - 13 mm
246.* *Antillophos elegans* (Guppy, 1866) - 21.4 mm
248.* *Engina* cf. *corinnae* Crovo, 1971 - 6.2 mm
265. *Morum dennisoni* (Reeve, 1842) - 36.3 mm
266.* *Granulina* cf. *ovuliformis* (d'Orbigny, 1842) [not seen before] - 1.5 mm
269.* *Volvarina* species - 8.4 mm
281.* *Terebra mugridgeae* García, 1999 - 9 mm
290. *Conus riosi* Petuch, 1986 - 38mm
291. *Conus stimpsoni* Dall, 1902 - 42mm
298.* *Drillia* (*Lioglyphostoma*) *canna* (Dall, 1889) - 5.5 mm
299.* *Drillia* (*Lioglyphostoma*) species 1 - 9 mm
300.* *Drillia* (*Lioglyphostoma*) species 2 - 12 mm
305.* *Glyphostoma epicasta* Bartsch, 1934 - 19.8 mm
307.* *Glyphoturris eritima* (Bush, 1885) - 5.1 mm
311.* *Ithycythara* cf. *psila* (Bush, 1885) - 5 mm
328.* *Vitricythara auberiana* (d'Orbigny, 1842) - 4.8 mm
331.* *Mathida* cf. *hendersoni* Dall, 1927 - 3.3 mm
332.* *Mathilda vanaartseni* de Jong and Coomans, 1988 - 5 mm
336.* *Adelacteon* species - 2 mm
339.* *Chrysallida* (*Foliniella*) species - 2.6 mm
351.* *Turbonilla* (*Chemnitzia*) cf. *coomansi* Van Aartsen, 1994 - 5.9 mm
353.* *Turbonilla* (*Chemnitzia*) *levis* (C. B. Adams, 1850) - 2.8 mm
355.* *Turbonilla* (*Chemnitzia*) species 2 - 3 mm
356. *Turbonilla* (*Odostomella*) cf. *doliolum* (Philippi, 1844) - 2 mm
357.* *Turbonilla* (*Pyrgiscus*) cf. *asperula* Bush, 1899 - 2.4 mm
359.* *Turbonilla* (*Pyrgiscus*) *portoricensis* Dall and Simpson, 1901 - 4.2 mm
363.* *Turbonilla* cf. *riisei* (Mörch, 1875) - 3.3 mm
364.* *Turbonilla* (*Pyrgiscus*) species 1 - 6 mm
380.* *Atys mandrewii* E. A. Smith, 1872 - 5.8 mm

Louisiana Mollusks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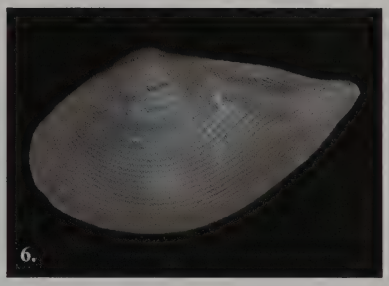
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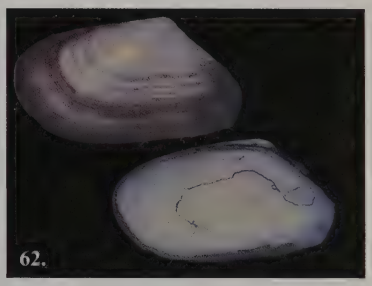
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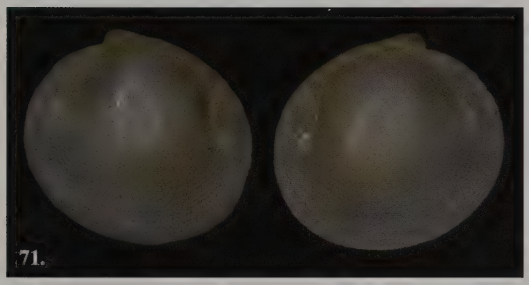
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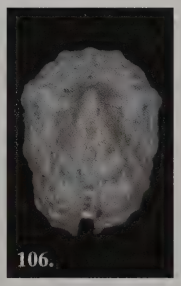
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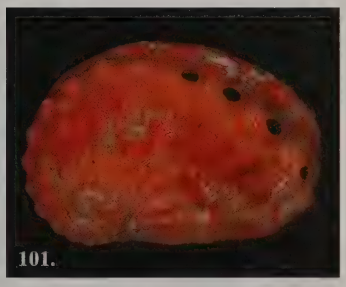
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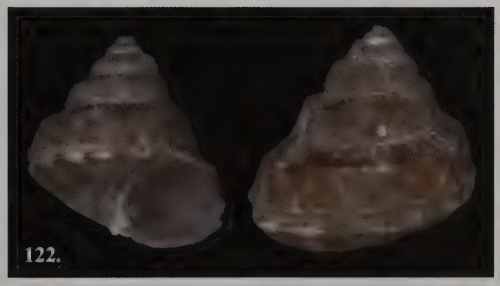
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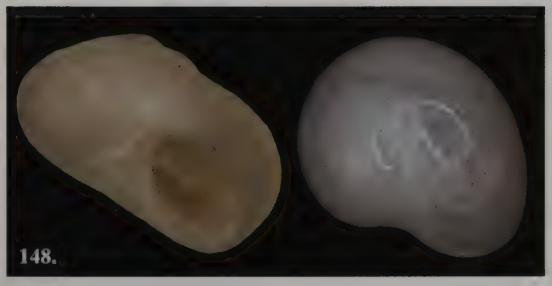
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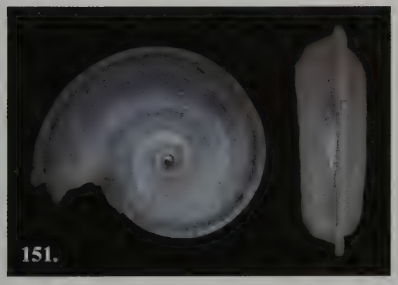
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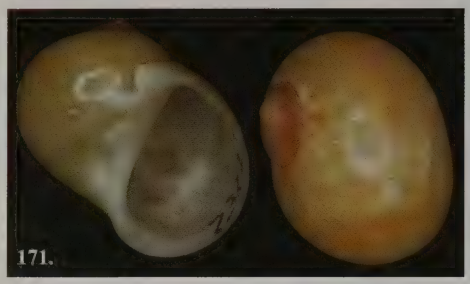
Louisiana Mollusks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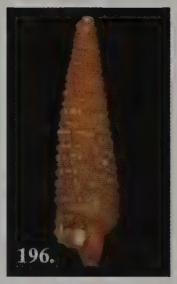
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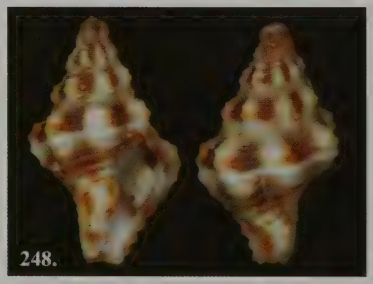
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Louisiana Mollusks

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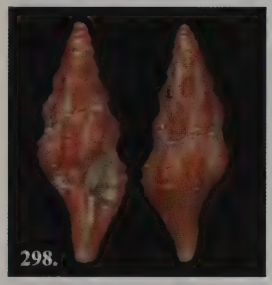
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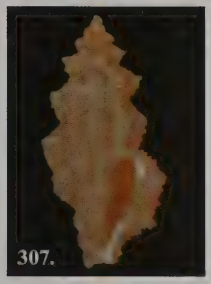
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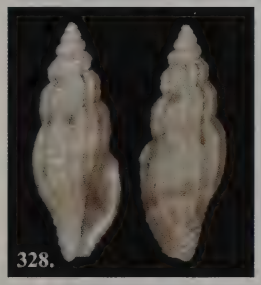
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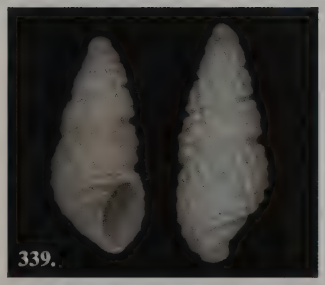
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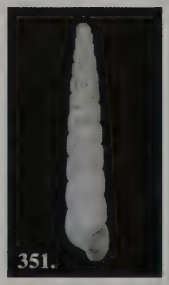
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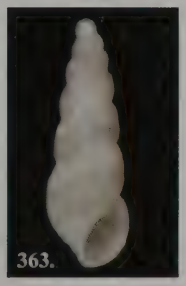
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SHELLS WILL REIGN ON PUGET SOUND

Since the earliest times, humans have studied that group of animals we now call mollusks. Whether for use as food, for decoration, or as a form of currency, mollusks have been an integral part of our history. Now, in the year 2003, we celebrate the knowledge and joy one can gain from the study of these intriguing creatures. We join together in a celebration of the enjoyment that shells can bring and proclaim that during the period of July 17 to 21, in the year 2003, SHELLS WILL REIGN ON PUGET SOUND! Gather ye all for this celebration at the Tacoma Sheraton Hotel as the Conchologists of America converge for their 32nd annual convention.

The native people of the Pacific Northwest have a relationship in actuality and myth with the mollusks. "Shellfish figure prominently in Northwest Native American myths and legends. In one creation story, humankind is said to have colonized the planet after escaping from a tightly sealed clamshell. In another, more light-hearted tale, shellfish are banished to a life in beach sand, after being sentenced by other animals for malicious gossiping. This, the story explains, is why beach-walkers frequently see small spurts of water shooting up from the sand. The clams are trying to clear the silt and seawater they've swallowed while attempting to tell their spiteful tales."* The hosts for C.O.A. 2003 (The Pacific Northwest Shell Club, Inc., and Of Sea and Shore Publications) celebrate this Native American heritage with a special opening ceremony and with the use of a stylized native image based on "The Watchman," who fortuitously carries a clam shell.

Following the opening ceremony the programs start with the first day devoted to subjects related to the Pacific Northwest. Rich in marine fauna, with more than 1,000 species of mollusks in its waters and on its land, this glacier-carved area we call the Puget Sound Region is an ideal place to celebrate these creatures and, combined with our reputation for precipitation, what motto would be more appropriate than "Shells Will Reign on Puget Sound"?

A slight change from previous conventions sees the Annual Auction held on Friday evening and the Dealers' Bourse on Saturday and Sunday. As both events are open to the public, we felt more might attend these events were they to be held on the weekend. The Bourse and Annual Auction, plus the silent auctions held during days when programs are scheduled, are great ways to add to your collection. Numerous door prize drawings during breaks in the programs provide free additions to your accumulation as well.

Field trips, ten in all, are scheduled before, during and after the days of the convention proper. These will include collecting trips for fossils, marine and land mollusks, a scuba dive to view the world's largest octopus, tours to Seattle and the Kitsap Peninsula; the latter including visits to a marine science center and five museums. And a Sunday evening cruise on Puget Sound culminating in a Native American meal and celebratory dances.

Three workshops are scheduled during our convention. One on a neglected group of mollusks – the chitons; another on a group widely studied, admired and coveted – the cones (led by widely recognized cone expert, Dr. Alan J. Kohn); and the third on shellcraft, led by longtime C.O.A. member Ruth Reetz whose creations recently decorated one of the Christmas trees at the White House.

The closing event of most C.O.A. conventions has been the Annual Banquet and we hold to that tradition. This year we are pleased to announce the banquet speaker will be Dr. Barry Wilson, of the West Australian Museum, who will speak on the cowries of the Australian Continent, a subject he and a co-author will cover in their new book scheduled to make its debut at our convention. A special treat for those attending the banquet – we'll be serving wines from Dr. Wilson's Australian vineyard!

So come one and all to the Evergreen State, to the City of Destiny, to help everyone have the usual great time that has become the legend of Conchologists of America Conventions. Come proclaim, with your hosts, that indeed "Shells Reign on Puget Sound"! We'll look forward to receiving your Registration Form (included in this issue).

Tom Rice, Chairperson, C.O.A. 2003

* From: *Heaven on the Half Shell: The Story of the Northwest's Love Affair With the Oyster* by David G. Gordon, Nancy E. Blanton and Terry Y. Nosho (copyright 2001, Graphics Arts Center Publishing Company).

Postcards from Tacoma and Seattle. Come and visit us for COA 2003!

Field Notes: *Cypraea mus* Linnaeus, 1758

By Peggy Williams (Tallevast, FL)

The first time I visited Amuay, on the Paraguaná Peninsula of Venezuela, I was looking for *Cypraea mus* in what I understand is the only place they may be collected intertidally. I discovered also that the people of Amuay eat molluscs, and there were impressive piles of shells in a dump at the end of the village. Besides bivalves, there were *Fasciolaria hollisteri* Weisbord, 1962; *Phyllonotus margaritensis* Abbott, 1958; *Melongena melongena* (Linnaeus, 1758); *Voluta musica* Linnaeus, 1758; *Chicoreus brevifrons* (Lamarck,1822); *Vasum muricatum* (Born, 1778); and *Haustellum chrysostoma* (Sowerby,1834), among others.

We found hundreds of *Cypraea* in the turtle grass in very shallow water when the tide was low. They were out feeding, moving about freely. There was one villager collecting them, and others were out collecting other shells for food. One of them kindly gave me a volute, and I thought it would be nice to get a picture of the volute and a *Cypraea* together in situ, so I swished the volute in the water to wake it up and placed it on the sand near a cowry. As soon as I did, the *Cypraea* put up its mantle, about faced, and RAN away!

Thinking about this, I realized that the volute is a predator species. So are the tulips, murex, crown conchs, and vase shells I'd seen on shore (but not in the water this close to the village). That's why there were so many *Cypraea* near the village: the locals eat all the predators (but not the meat-poor cowries)!

Having visited the area six or seven times now, I found there are far fewer *Cypraea* in the shallows because the villagers have discovered that they can sell the cowries to dealers. They are still there however, especially in slightly deeper water where the turbidity endemic to the area makes them hard to spot (the kids find them by feel). And now they are also on the garbage piles.

Amuay grassflat denizens: 1. *Conus centurio* Born, 1778 2. *Cypraea mus* Linnaeus, 1758 3. *Voluta musica* Linnaeus, 1758 4. *Chicoreus brevifrons* (Lamarck, 1822) 5. *Latirus infundibulum* (Gmelin, 1791)

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American CONCHOLOGIST

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Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

Volume 31, No. 2 June 2003

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors – to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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Front cover: *Cassis madagascariensis* Lamarck, 1822 on a beach at Eleuthera by Jim Miller. See Jim's articles (and photos) on page 10.

Back cover: Closeup of a live *Pecten diegensis* Dall, 1898, currently a resident in Paul Kanner's 60 gallon, cold water (65°F) marine aquarium. The tank is also home to a number of other sea creatures. Photo by Paul Kanner.

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President's message:

It is hard to believe that we are already starting the summer season. Our annual convention is coming up and preparations are moving at a frantic pace. Tom Rice and his hardworking committee are endeavoring to ensure we have a wonderful time in Tacoma, Washington. If you haven't sent in your reservation get to it, you don't want to miss out.

Talking with the convention auction coordinators, Jim and Linda Brunner, material has been coming in to support both silent and vocal auctions. But as you are aware they can always use new and additional material. Send donations to:

Jim & Linda Brunner
PO Box 8188
Southport, FL 32409
(Questions? email LIJI@earthlink.net or call (850) 265-5557. Your donation is tax deductible.)

According to Doris Underwood, our membership is flourishing. She has been busy getting new memberships coordinated. We have been fortunate to see a number of new foreign members coming into the organization. Welcome!

Tom Rice told me that we are really going to be seeing this upcoming convention as an international event. This is in terms of both convention goers and dealers. Very exciting.

Speaking of the annual conventions, as you know the 2004 convention has been nailed down. Betty Lipe and her committee are hard at work with getting everything together for next year in Clearwater, Florida. She will be laying out everything about 2004 at the general meeting in Tacoma.

At this time the COA Board of Directors is looking for a host to commit to the 2005 convention. To date there have been several inquiries, but no commitments. We need to get moving on this. If you or your organization has any ideas about sponsoring the event, let a member of the Board know and we'll work with you.

Finally, I'd like to give Tom Eichhorst a big thank-you for all he has done in getting through his first year as our *American Conchologist* Editor. I believe he has done a wonderful job in continuing to ensure a quality periodical is given to our membership.

Best wishes for a wonderful summer. I am looking forward to seeing as many of you as possible on the shores of the Pacific Northwest's Puget Sound in July. As usual, we will have our annual election at the convention. The nominations for 2003-2004 are:

Office of President.....Tom Grace
Office of Vice-President..... Henry Chaney
Office of Secretary..... Alice Monroe
Office of Treasurer..... Steven Coker
Office of Trustee..... Charlotte Lloyd

TAG

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Correction to mislabeled photos in Collecting Trophons in Argentina - One More Time by Emily Vokes, March 2003 issue.

Two photographs in this article had incorrect captions. With sincere apologies to Emily Vokes and our readers, the relevant portion of each photo is reproduced here with proper captions. --editor

Top row: *Trophon geversianus* from Bahia San Pablo. Bottom row, left to right: *T. geversianus* operculum, single egg case, and egg case cluster.

Top row: *Trophon sp.* from Punta Quirosa. Bottom row, left to right: *Trophon sp.* operculum, single egg case, and egg case cluster.

Snail Coiling

by
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Introduction: There is more to gastropod coiling than common shell right-handedness and rare shell left-handedness, these often being called respectively dextral and sinistral. Although these are nearly always opposites, dextral and sinistral can be defined anatomically, and I do this here. No living snail, limpet or slug (body or shell) is exactly symmetrical bilaterally (a mirror image from side to side), although it can appear so externally. They all show the aftereffects of body twisting (torsion) in the larva or its partial untwisting or nearly total suppression, which apparently have nothing to do with coiling. As a consequence of this asymmetry, there are some left-handed shells containing dextral anatomies and vice versa (fig. 1, **A** to **D**). As shown, there are four, not two, major kinds of coiling in theory and actuality.

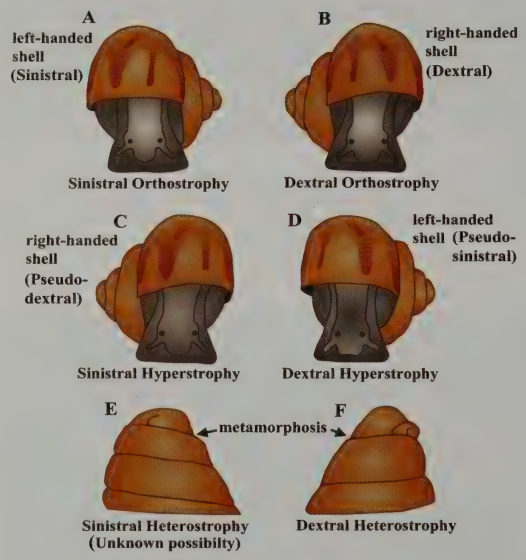

Fig. 1. The four main kinds of gastropod coiling (A-D), with the rectum and anus and the heart (with its single auricle) and single ctenidium (with some lamellae) indicated (modified from J.B. Knight after Naef). Potentially and actually there are living snails that are: A, sinistral and orthostrophic; B, dextral and orthrostrophic; C, sinistral and hyperstrophic; and D, dextral and hyperstrophic (where "dextral" and "sinistral" refer to the animal and not necessarily the shell). Heterostrophic shells (E & F), start by coiling hyperstrophically and at metamorphosis change to orthostrophy. E is a hypothetical structure not yet found in nature; F is a pyramidellid (*Odostomia*) apex.

Fig. 2. Transitions from orthostrophy to hyperstrophy (right to left in all three rows). A and B show the coiling transition in shells and animals of the dextral Ampullariidae (from K. Heschler). C shows the transition in a generalized sinistral basommatophoran (from J.W. Taylor). The heart is shown in black. All are freshwater.

Technical Terms: Some of the other terms for coiling, e.g. hyperstrophy, heterostrophy and orthostrophy, are not included again in the text here, but are given in fig. 1. The different kinds are indicated in the text respectively by the letter designation in figure 1 (**A** to **D**).

Origins: In fig. 1, a helically spiral shell is "pushed" through itself regardless of spire direction in **coilings B** to **D**, and **coilings A** to **C**. **Coilings B** and **D** and **coilings A** and **C** are mirror images shell-wise but little changed anatomically. In fig. 2, consider the shell and extended animal at the right ends of the rows and their transitions to those at the left ends. The apices and spires are "pulled inside out" with an intermediate, planispiral (flat) coiling stage (fig. 3 & 4). Then the center of the shell is "pushed" beyond the original base, creating a new "spire." This projects in the direction opposite the original spire. In

Fig. 3 (above). Ramshorn snail *Marisa cornuarietis*, dextral and planispiral. Freshwater, Suriname.

Fig. 4 (below). *Bostryx* (*Discobostryx*) *planissimus*. Near planispiral. Terrestrial, Peru.

conventional orientation this and the new "spire" will be oriented upwards, but the coilings will have been transposed. Viewed from the exterior, all spiral opercula coil or grow counterclockwise on dextral animals (fig. 5).

Parts of the anatomy (fig. 1), including the horizontally striped ctenidium ("gill"), are shown diagrammatically on the animal's right side (our left) in **coilings A** and **C**, and on the animal's left in **coilings B** and **D**. The heart is shown darkest and above each ctenidium. The near vertical stripe shows the position of the rectum. Comparing dextral with sinistral: the three anatomical structures are consistently in mirror image positions. The anatomical adjustments from **coilings B** to **D** and **A** to **C** are minor and probably not a genetic trait. But a **B-coiling** (dextral) animal cannot possibly become **A-coiling** (sinistral) in one lifetime because the whole asymmetric anatomy

Fig. 5. West Indian "whelk" *Cittarium pica*. Multispiral, counterclockwise operculum in a dextral shell, coiling B,

is reversed. Abnormal sinistrality of the shell is commonly a recessive genetic trait, and is therefore determined near fertilization of the egg. Embryologically, even the early stages of cleavage are reversed.

Some of the shell orientations in the photographs used for this article may appear haphazard but the convention here is to place the anatomies in the same relative positions nearly throughout. Thus the shells in fig. 6 and fig. 9 are left-handed but not coiled sinistrally, they have **D-coiling**.

Larval Coiling (fig. 1 **F** & fig. 7): Larvae (floating or swimming young) in the plankton and their bottom-dwelling adults can have different shell coilings. Both are **D-coiled**, first left-handed and then suddenly becoming right-handed. **F-coiling** species have larval or protoconch **D-coilings** that attach and are retained at the apices of **B-coiling** post-larval animals that retain this to adulthood. The coiling change occurs suddenly near or at metamorphosis from the plankton. **E-coiling** is theoretically possible, but not known. My report of it (Robertson, 1993) in the sinistral ellobiid *Blauneria* was incorrect.

Frequencies: Most of the gastropods seen by shell collectors will be right-handed and dextral (fig. 1, **coiling B**). Nearly all the others will be left-handed and sinistral (**coiling A**). Large, left-handed **D-coiling** shells are found in freshwater in certain parts of Africa (Ampullariidae: *Lanistes*. fig. 6) and

Fig. 6 (top left). *Lanistes boltenianus*. Dextral and hyperstrophic (coiling D). Species in this genus are the largest gastropods that are commonly hyperstrophic. Freshwater from the Nile region, Africa.

Fig. 7 (middle left). The sundial *Philippia* (*Psilaxis*) *krebsii*. Swimming hyperstrophic veliger, marine planktonic, tropical North Atlantic Ocean.

Fig. 8 (bottom left). The planorbid *Carinifex newberryi*. Sinistral and hyperstrophic (sometimes called pseudodextral), coiling C. Freshwater from Shasta County, California.

Fig. 9 (bottom right). Upper row, normal dextral *Turbo sarmaticus*, coiling B; lower row, very rare dextral and hyperstrophic (pseudosinistral shell), specimen, coiling D. Marine, South Africa. Note the normal dorsal pattern and sculpture is now on the ventral portion of the dextral hyperstrophic shell. Shell coutesy of Harry Lee, image courtesy of Bill Franks, web master of the Jaxsonville Shell Club web page.

Fig. 10 (above left). *Amphidromus perversus* Lamarck, 1822. Ambidextrous, sinistral, coiling A (left), dextral, coiling B (right), both orthostrophic. Land, Indonesia.

Fig. 11 (above right). *Busycon contrarium.* Normally sinistral, coiling A (right), abnormally dextral, coiling B (left), both orthostrophic. Marine, west Florida.

Fig. 12 (left). *Cymbiola vespertilio.* Normally dextral, coiling B (right), abnormally sinistral, coiling A (left), both orthostrophic. Marine, Philippines.

Fig. 13 (right). *Triphora sp.* Normally sinistral, coiling A, orthostrophic. Marine, tropics.

extremely rarely in other familes (*Turbo* fig. 9). **Coiling C** will be found only in freshwater at certain places in California (Planorbidae: *Carinifex,* fig. 8). **Coiling F** is microscopic and will be seen in many "opisthobranch" larvae or retained as protoconchs at the apices of post-larval or adult shells. Thus you will see mainly **B-coilers**, less often **A-coilers**, and many **F-coiling** larvae collected with a plankton net or present as protoconchs in shell collections and studied with a dissecting microscope. Examples of such shells are in the Architectonicidae (fig. 7 shows a veliger) and Pyramidellidae and their relatives. You are not likely to see living **C** or **D-coilers**, and **E-coilers** perhaps do not exist.

"Normality": "Normal" and "abnormal" coilings are here defined as occurring, respectively, in >99% or <1% of a population. If a coiling frequency is between 1% and 99%, the species is called ambidextrous, dextrals and sinistrals occurring frequently together (fig. 10). Generally, the percentages are much nearer 100% or 0%. Some families and genera perhaps are never abnormally sinistral, but the numbers of animals needing to be observed and counted to prove this might exceed the total population sizes of whole species and the longevities of the observers. Some marine families and genera are predominately sinistral (e.g. the Triphoridae, fig. 13). Others are more frequently sinistral abnormally (e.g. the Volutidae, fig. 12 and Marginellidae). The very rare abnormally sinistral Indian chank (*Turbinella pyrum*) is highly revered by Hindus. Some species in the American "whelk" genus *Busycon* are said normally or abnormally to be sinistral. These co-mingled normal and abnormal coilings generally do not track together among animals of the same genus.

"Prosobranchs": Differently coiled larvae and their adults are wholly unknown in all the very familiar sexually separate, operculum-bearing marine snails. Indeed, its presence

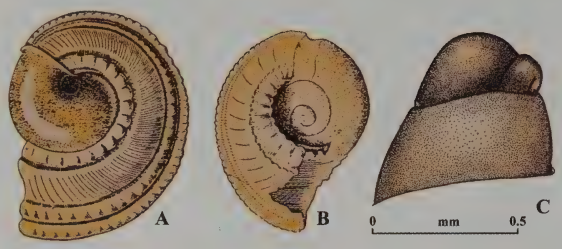

Fig. 14. Heterostrophic (hyperstrophic) protoconchs and young postlarval orthostrophic teleoconchs (coiling F). A & B are the sundial snail *Architectonica sp.* (from Hedley, 1903), marine, southeastern Australia. C is the pyramidellid *Odostomia acuta* (from Thorson, 1946), marine, Europe.

Fig. 15. Shell of the sea butterfly (thecosomatous pteropod) *Limacina retroversa*. Dextral and hyperstrophic (coiling D). Scanning electron micrograph of a 3.3 mm shell. Marine, holoplanktonic, western South Atlantic Ocean.

and much other evidence led to the recent transfer of some families such as the Architectonicidae and Pyramidellidae to near their sea-slug but adult-shelled relatives. Only larval triphorids and a few other "prosobranch" larvae are left-handed and truly sinistral anatomically. The most common living gastropod with left-handed but dextral (**D- coiling**) is *Lanistes* (fig. 6). It and its ampullarid relatives include **B-coiled** species, other species grading into **D-coiling**, and still other species such as the one illustrated that are totally **D-coiled**. The D-coiled *Turbo sarmaticus* (fig. 9) is a rare occurrence. Thus **coilings B** and **D** can grade into each other, and the evolution of *Lanistes* may have paralleled the explanatory sequence in the first paragraph on "Origins" given above.

"Opisthobranchs": Sea slugs and their shelled ancestors and relatives, nearly all still with larval shells, are nearly planispiral (flat-coiled) or **F-coiled**. Reports of "sinistral" marine slug larvae are based on **F-coiled** specimens. Remarkably, true sinistrality, both abnormal and normal, is totally unknown in all nudibranch and sacoglossan sea slugs and their shelled relatives. The sea slug with the suggestive name *Acteonia senestra* (Quatrefages, 1844) was probably a single damaged adult animal with some of its viscera extending through its body wall. The mid-water thecosome pteropod *Limacina* ("sea butterfly") has **D-coiling** in the adult [fig. 15], and this perhaps is retained unchanged from the larva.

"Pulmonates": Pulmonate land snails and slugs are hermaphrodites (male and female in one animal), exist in dextral and less commonly sinistral, and rarely ambidextral populations. Opposed coiling pairs encounter behavioral, courtship and morphological problems when they try to cross-fertilize. The anatomical problems are greatest in the lowest-spired or flat-coiled species. High-spired land shells do not have this as a major impediment, which presumably is why sinistrality is more common among them. The number of pulmonate species known abnormally, or rarely, or exceedingly rarely to be sinistral exceeds the number of species known normally or invariably to be sinistral. This suggests that normal sinistrality has evolved somewhat rarely from abnormal sinistrality or that sinistrality does not persist as well. In shell-less land slugs the very rare abnormally sinistral individuals have the pore into the lung on the wrong, left side. Thus handedness shows, even if there is no shell.

Dominant Dextrality: Among all the operculate marine snail "prosobranchs" and "pulmonate" land snails the larval and adult coilings always match. **C** and **D-coilings** are rare in living adult gastropods, but in the fossil record may have been more frequent. For some unknown reason, dextrality (especially **coiling B**) appears always to have predominated, even in the oldest gastropod fossils. These are Cambrian in age, and it is obvious from these that the frequencies of the six possible kinds of coiling have fluctuated greatly over the very many subsequent millennia. Without anatomy, it can be difficult to infer whether some fossils were **D**s and not **A**s. It remains unknown whether or how these various coilings were or are advantageous to the animals.

I wish to acknowledge my wife, Harriet H. Robertson, helped greatly with this paper, its 1993 predecessor, and the subject generally.

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Jordan Star's Web Picks

★★★ - **Sanibel Seashell Industries – http://www.seashells.com/.** Seashells, corals, crafts, starfish, etc. A good source of shell craft items and shells. Has more than just shell related crafts. Also displays, supplies, and general marine related items.

★★★ - **Malacological cabinet - http://pw1.netcom.com/%7Eejpower/macab/malcabinet.htm.** A long web address but has interesting pictures of shells. Some pictures of hydrothermal vent mollusks. A non-commercial site.

That's all for my small collection of shell favorites (bookmarks). Now for some non-shell sites that may be of interest to shell collectors.

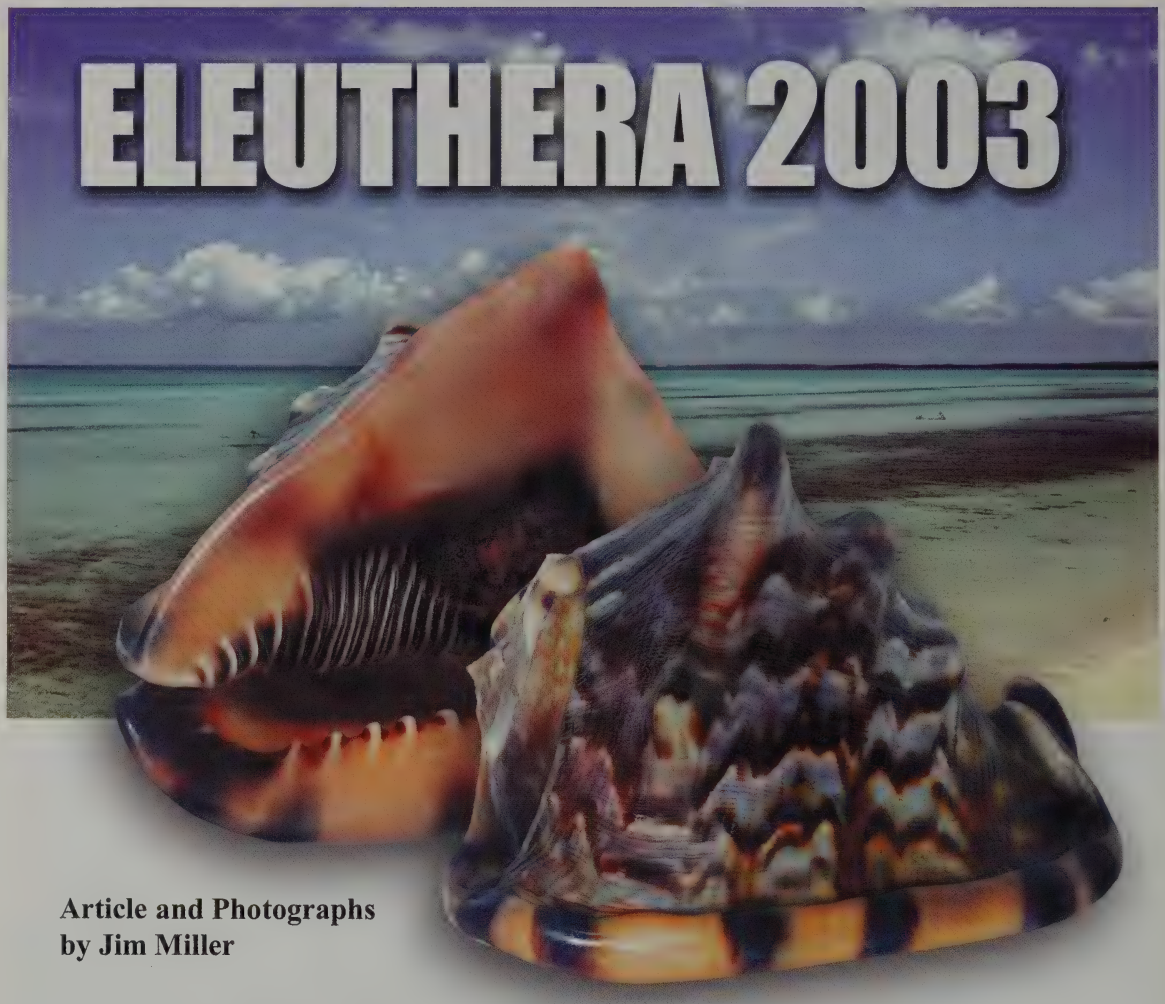
★★★★ - **How Stuff Works - http://www.howstuffworks.com/.** Learn how everything works! An outstanding site with a wide range of topics from mechanical systems to biological systems. The section on biological systems seems to be all human (no mollusks). But a great spot for an overview of how pretty much anything works.

★★★★ - **MapQuest.com - http://www.mapquest.com/.** A very handy site where you can input any US address or road intersection and print out a detailed map of the area and driving directions if needed. If traveling in the US only, a must web site for maps to get to that favorite shelling site. For foreign locations, see the next web site.

★★★ - **Maporama.com - http://maporama.com/** Not a complete list of maps but it's very hard to have a complete list. A guide to the best beaches overseas.

Links good as of 6-6-03

ELEUTHERA 2003



Article and Photographs by Jim Miller

My last visit to Eleuthera was in September of 2001 (chronicled in the December 2001 issue of *American Conchologist*). But thanks to an interesting series of events I found myself on a Twin Air flight back to that peaceful island with three fellow shellers in May of 2003. Both Scott Schubbe (Tampa) and I had been there before, but this was the first visit for Paul Kanner (Los Angeles) and Mike Schenk (Colorado Springs). Both were anxious to try their luck, particularly after hearing what Scott and I had brought back from our previous outings.

We took an early morning flight out of Ft. Lauderdale and arrived at the Rock Sound airport at about 9:30, cleared customs, grabbed our gear and decided to forgo dropping off our luggage and instead headed directly to Cape Eleuthera and were in the water not long after 10 AM.

Cape Eleuthera is a fascinating place, in that it combines a number of interesting habitats, from a sandy grassy lagoon to a rocky shore. I had not been in the water long before I made my first discovery, a *Strombus raninus* - probably the nicest specimen I have ever found. There is a stiff current that runs just a short distance out from the lagoon and Mike decided to brave the rushing waters, ultimately being rewarded with the first *Cassis tuberosa* and *Charonia variegata* of the trip.

As we eventually worked our way around to the rocky area, Paul found a knockout *Cassis tuberosa* with a very clean dark dorsum, while Scott made a stunning find: a gem *Cassis flammea* with a deep burnt orange parietal shield. I only found one helmet that day, but it was a beauty, although it wasn't apparent at the time just how special it would turn out to be (more on that later). Everyone found something of interest and I was

rewarded late in the day when I turned a rock over and found a wonderfully dark *Cypraea zebra*.

On our way back north to Tarpum Bay, where we would be staying, we stopped at an interesting spot right beside the Queen's Highway which gave us access to the waters of Rock Sound. All of us found some exceptional *Phyllonotus pomum* (apple murex) with unusually long siphonal canals and even some small, nearly black *Chicoreous florifer* that almost looked like the *Murex dunni*, typically found farther north in the "Salt Pond," actually more of a small salt water lake.

With our first day behind us, we decided to make the most of our time in the Bahamas and were up before sunrise the next morning for a drive to the northern part of the island to a place called Glass Window. This is the narrowest part of the island and standing on the bridge you can see the deep blue waters of the Atlantic, with waves crashing onto the rocky cliffs of the east side, while on the west side is the placid, gin-clear water of the Caribbean Sea.

In 2001, this was a spot where I not only found several amazing specimens of *Chicoreus florifer*, but a gem specimen of *Cymatium femorale* as well. I was not as lucky this time, as I didn't chance upon another *C. femorale*, but I did find several nice *C. florifer*. Paul found the best one of the day, a large dark specimen. We worked our way back southward, stopping at various points along the highway. Unfortunately, the side road which used to run past the Governor's Harbour airport was closed, so we weren't able to get to that particular spot. While we did revisit a few locations where I had collected some exceptionally large specimens of *Fasciolaria tulipa*, there were few to be seen this day, though masses of egg cases were common. There were also very few of the dwarf *Strombus costatus* I had seen in huge numbers in 2001, though we did chance upon an albino specimen.

Eventually, after a stop at the Salt Pond where we each picked up a few *Murex dunni* (there are many thousands of them here), we decided to head back to the cottages for dinner and possibly a dip in Tarpum Bay. But on the way I spotted a little used road cut through the brush and on a whim, turned off the main highway and drove us to the edge of the water. "Let's give it twenty minutes or so," I told everyone. "If we don't find anything interesting, we'll head back."

We weren't in the water more than a few minutes before Scott announced he found a nice *Chicoreus florifer*. Soon both Paul and Mike had spotted a few. Before long it seemed they were finding them everywhere. Sadly, as I have gotten older and my eyesight has gotten worse, I was the only one who didn't seem to be seeing them everywhere. While there were specimens out in water that was over 15 feet deep, most were in a very specific zone that included their favorite meal, small mussels that literally cover the rocks in about two to three feet of water.

By the time the twenty minutes had passed everyone but me had probably seen dozens and we ended up staying there, looking for the choicest specimens. By the time an hour passed we must have seen hundreds, although I didn't pick up my first two until just before we climbed out of the water. The next day we had an arrangement with one of the locals to take us in his boat out to the Schooner Cays, five small islands northwest of Cape Eleuthera. I won't waste time in getting to the bottom line, we didn't see anything that looked remotely interesting other than a rather large nurse shark which placidly swam right below Mike and me. In fact much of the bottom here seemed devoid of any mollusks, although there were quite a few immature *Strombus gigas* ("rollers") at water's edge. We eventually decided to just go back to Cape Eleuthera where I found another nice *Cassis tuberosa* and Scott found the nicest *Conus mus* I have ever seen. As the tide changed we started fighting a tremendously strong current, so we eventually got back in the car and headed back to our "home base."

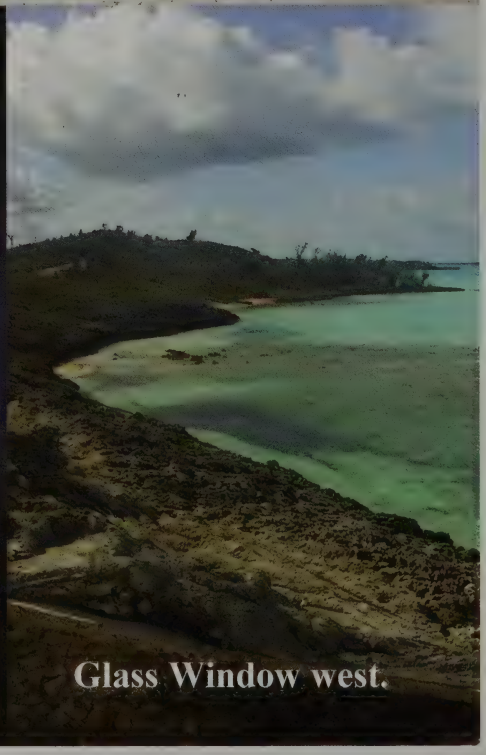
The following morning, our last full day on Eleuthera, dawned clear and bright and we set out for a spot called Millar's Beach where in 2001 I had found two huge specimens of *Cassis madagascariensis*. We arrived to find the waters almost flat calm and we each headed out in a different direction. I was fortunate enough to spot faint trails in the sand out in deeper water that led to two exceptional *Strombus gigas* ("queen conchs").

Eventually, we all met back at the car. Mike had also found several nice *C. madagascariensis* specimens (one measured 223 mm), as well as a dark "chocolate" *Cassis tuberosa*. Paul found the smaller cowrie species, *Cypraea spurca acicularis* and *Cypraea cinerea*, as well as a *Cymatium muricinum* and what he identified as a *Cymatium martinianum*. Paul also ended up with one of the best specimens of *Cymatium femorale* I have seen, with a thick, nearly flawless periostracum.

We tried to drive down the road to Lighthouse Point, but it was in such bad shape that after a few miles we were forced to turn back. We hit a few spots in Rock Sound before eventually ending up back at the spot we started calling "Floriferville." This time I was able to locate a few choice specimens, including one

Three colorful *Cassis madagascariensis* Lamarck, 1822 (in front) and a large *Cassis tuberosa* (Linnaeus, 1758).

(Left): *Cymatium raderi* D' Attilio & Myers, 1984
(Right): *Cymatium femorale* (Linnaeus, 1758)



Glass Window west.

(Above) ***Charonia variegata*** **(Lamarck, 1816).**

(Above right) ***Cymatium femorale*** **(Linnaeus, 1758) with intact periostracum and the typically small corneous operculum.**

(Below right) ***Chicoreus florifer*** **(Reeve, 1846) with an unusual bright orange coloring.**

that turned out to be almost fluorescent orange. Out in deeper water I also discovered the remains of nearly an entire automobile, as well as having a wonderful chance encounter with a manta ray that swam close by for a quick look.

Scott's list of interesting finds included: *Cassis flammea*, a gem *Phalium cicatricosum*, two *Mitra barbadensis*, one *Mitra nodulosa*, six *Coralliophila abbreviata*, three *Americardia media*, a huge *Astraea caelata*, along with specimens of *Marginella carnea*, *Conus mus*, *Cymatium cingulatum*, *Tonna maculosa*, *Vexillum variatum*, and *Lithophaga antillarum*.

Mike's finds included: three *Cassis tuberosa* (including one that measured 254 mm), *Cassis flammea*, *Charonia variegata* (perfect color and condition from tip to aperture), *Phyllonotus pomum* (90mm), *Cittarium pica* (92mm), three *Xenophora conchyliophora*, *Cyphoma mcginyti*, *Cymatium nicobaricum*, *Tripterotyphis triangularis*, *Murex chrysostoma*, *Murex recurvirostris*, and lots of various *Chicoreus florifer* color forms with sizes up to 70mm.

Saving the best for last, I went snorkeling late on our last night and was astounded by the sheer number of *Oliva reticularis* out scavenging the flats along with hundreds of tiny *Fasciolaria tulipa* in every imaginable color. In the thick grasses

Beach at Tarpum Bay

I saw what at first appeared to be a grass covered rock, but ultimately it turned out to be a *Cymatium raderi* (D'Attilio & Myers, 1984). Naturally, like everyone else, I thought of *C. raderi* as a species found much farther south and all the specimens I had ever seen had been collected in Brazil. Yet here was (in my mind, at least) a large (8.25 inch) *C. raderi* cruising for dinner in the warm shallow waters of Eleuthera.

Subsequent to my return home, I turned to Bill Frank and Dr. Harry Lee to confirm my identification and they both agreed that the shell was without question *Cymatium raderi*, meaning this was a significant range extension for the species.

I mentioned earlier the *Cassis tuberosa* I found at Cape Eleuthera and it was only once I was home that I discovered that one had a striking blue and violet dorsum with chocolate brown markings, while another was almost a raspberry color with some darker markings and a gorgeous deep butterscotch orange parietal shield. While the three *C. tuberosa* specimens we collected on our 2001 trip were all rather light colored, the specimens taken from the exact same place in 2003 exhibited much darker (and quite unusual) colors. Mike reported later that several of his specimens cleaned up to show a purple dorsum and Paul's beauty, taken the first day, was almost black with deep amber highlights.

Taken all together, the shells we found on this trip included some astonishing finds and all four of us agreed that we would love to make the trip again. I had been shelling with Paul, Scott and Mike individually, but this was the first time we were all together in the same place and the chemistry was perfect. I could go on and on, but at this point, I'll let the photos do the talking for me. Like the rasberry colored *Cassis flammea* below.

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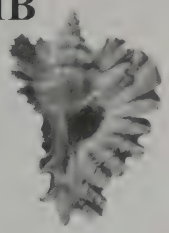

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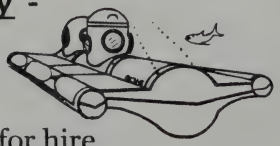

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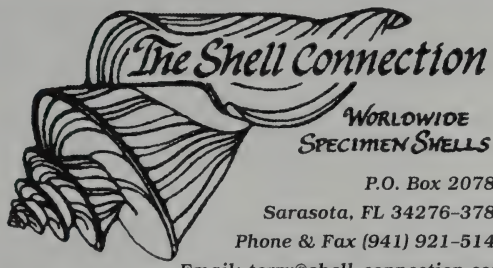

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COA Awards

At the Naples 43rd Annual Shell Show held on February 13-16, 2003 COA member Irene Longley won the COA Trophy with her exhibit "Treasures of the Sea."

Alice Monroe won for her exhibit "Biological Phenomena using Shells as Examples." This was the 56th annual St. Petersburg Shell Expo - a well attended event on Treasure Island, Florida, 21-23 February, 2003.

Jim VunKannon's 30 foot exhibit of "Shelling in Venezuela" won the COA at the Sarasota Shell Show on February 7-9 of this year. Jim's display had wonderful backboards maps, photographs and shells from that area. Good job, Jim!

COA Member John Chessler was awarded the COA Trophy at the Broward Shell Show on February 1-2 with his exhibit of the "Family Bursidae." John's 14 foot display represented the entire Family and It gathered many compliments from the judges and visitors. (No picture)

A very busy Jim VunKannon was awarded his 2nd COA for the year at the Marco Island Shell Show on March 13-15. Jim exhibited 18 feet of beautiful shells and background material on "Florida Caribbean – Turk & Caicos." Way to go Jim!

In Memoriam

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If you've ever found a message in a bottle during a shelling expedition, I'm looking for you. My name is Dan Parker, and I'm a Texas-based writer currently working on a book full of true stories about discoveries of messages in bottles on seashores all over the world. I've found dozens of people who have found messages in bottles, and some of them have some amazing stories to tell about their finds. Stories about bottles that have traveled thousands of miles before being discovered on foreign shores. Stories about bottles that drifted for decades before being found. Stories about messages that sparked friendships that have lasted for decades. And I've come across other bottle messages that aren't so dramatic but still are interesting. A piece of poetry here. A love letter there. I like those too.

I've found that, perhaps not so surprisingly, avid beachcombers are the ones most likely to find messages in bottles. I'm wondering if there are any *American Conchologist* readers out there who have found messages in bottles while searching for shells. If you have, I urge you to contact me so that I might possibly include you in my book. While I've documented quite a few message-in-bottle experiences, I'm urgently looking for more.

My background: I'm a 41-year-old native Texan who has worked as a reporter at daily newspapers all over the U.S. for the past 18 years. My most recent job was at the Corpus Christi (Texas) *Caller-Times*. I quit that job in January in order to be a full-time stay-at-home father to my 6-month-old son and to finish writing this book.

2003 SUMMER & FALL SHELL SHOWS AND MEETINGS

Jun. 28-29 - **Jacksonville Shell Show,** Jacksonville Beach, FL
Days Inn Oceanfront Resort, Jacksonville Beach
Pam Rice (904) 264-0624 price@wallace.com
Chris Cavan (904) 642-0147 price@wallace.com

Jul. 12-13 - **Keppel Bay Shell Show,** Yeppoon, Queensland, Australia
Jean M. Offord, 277 McDougall St.,
N. Rockhampton, Qld. 4701, Australia 61 (7) 4928-3509

Jul. 17-21 - **CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION,** Tacoma, WA
Tacoma Sheraton Hotel, Tacoma
Tom Rice, P.O. Box 62
Port Gamble, WA 98364
E-mail: ofseashr@sinclair.net (360) 297-2426

Jul. 19-20 - **Townsville Shell Show**, Townsville, Queensland, Australia
Cutharinga Bowls Club on Harold Street, West End
Glenda Rowse, 19 Farrell Street
Kirwan 4814, Queensland, Australia (7) 47 73 28 17

Aug. 15-17 - **Jersey Cape Shell Show**, Stone Harbor, New Jersey
Wetlands Institute, Stone Harbor
Jersey Cape Shell Club, P.O. Box 124
Stone Harbor, NJ 08247 (609) 653-8017

Sept. 19-21 - **North Carolina Shell Show,** Pine Knoll Shores, NC
N.C. Aquarium at Pine Knoll Shores
Ann Buddenhagen, 804 Westwood Drive
Raleigh, NC 27607(919) 787-7103
E-mail: pabjetster@aol.com

Sept. 20-21 24 - **International Shells & Fossils Bourse,** Ottmarsheim, France
Salle Polyvalente, Rue de la Priscine
Michel Rioual, 2 Rue des Vergers
68490 Ottmarsheim, France (3) 89-26-16-43

(Cont'd page - 25)

Gyroscala turnerae (Altena, 1971) (Gastropoda: Epitoniidae), a western Atlantic junior synonym of the Indo-Pacific *Gyroscala xenicima* (Melvill & Standen, 1903)

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INTRODUCTION:

Gyroscala xenicima and *Gyroscala turnerae* are two widely distributed epitoniid species in the Indo-Pacific and western Atlantic respectively. In spite of their large geographic ranges and relatively shallow-water habitat, both are found only sporadically, usually as faded empty shells in various stages of erosion and missing protoconch and early teleoconch whorls. Likely because of these attributes, the two seldom appear in epitoniid collections, including such classic ones as that of the late Mrs. Helen DuShane, which lacks both (Dr. Henry Chaney, pers. comm.).

Although described in 1903, *Gyroscala xenicima* was not reported as inhabiting the Hawaiian Islands until more than three-quarters of a century later (DuShane, 1990), even though these islands have attracted malacological researchers for over a century. Its relative rarity is exemplified by the fact that, after reviewing several hundred lots of epitoniids at the Muséum National d'Histoire Naturelle, Paris, I could find only two lots of *G. xenicima* with a total of three specimens.

Gyroscala turnerae has a rather similar history. Although it is easily identified because of its unusual coloration, it was not described until 1971. It does not appear in Abbott's 1974 edition of American Seashells, nor does it appear in any of Kaicher's three epitoniid issues (approximately 300 taxa) of her Card Catalogue, published between 1980 and 1983. Díaz & Puyana did treat it in *Moluscos del Caribe colombiano* (1994) and consider it a rare species.

The understanding of these two taxa has been hindered not only by the lack of published material but also by the fact that collectors and other students of Indo-Pacific epitoniids usually ignore Atlantic species, and vice versa.

It is my objective to take a closer look at these two taxa that in my view, are synonymous.

PREVIOUS LITERATURE:

In 1903 Melvill and Standen described an epitoniid species from the Gulf of Oman as *Scala (Opalia) xenicima*. Translated from the original Latin version, they described it as follows: "Shell imperforate, fusiforme, acuminate, light, livid-brown, rather glossy, 11-12 whorls; 2.5 whitish, glassy, smooth protoconch whorls; the others ventricose, with longitudinal irregular lamellae; lamellae sharp, very thin; surface of the last three whorls partially covered with spiral striae, particularly in the middle; in the last whorl only from sutures to the periphery; more conspicuously, [there is] a clearly distinct spiral ridge near the base; aperture almost round, pale-brown inside; lip wide, thickened; columellar margin shiny, white." The largest of three specimens measured 14 mm in length and 5 in width.

Originally described from the Gulf of Oman, the species was eventually found throughout the Indo-Pacific, from South Africa (Kilburn, 1985:249) to Hawaii (DuShane, 1990). Kilburn (1985:249) reassigned this taxon to *Amaea (Acrilla),* and re-described it as follows: "Shell narrowly acuminate with about 10 strongly and evenly convex teleoconch whorls, aperture elliptical, labium and columella thin; base imperforate, with a very thin peripheral cord, showing above suture on spiral whorls. Axial ribs very narrow and sharp, widely spaced, strongly arcuate, markedly sinuous on body whorl, where they cross basal cord, 10-13 per whorl; intervals polished, with feeble, scratch-like spiral striae (sometimes obsolete). Colour yellowish-white to light brown, rarely with obscure brown zones. Protoconch orthoconic, of 4 slightly convex whorls, apparently smooth, maximum diameter 0.4 mm. Dimensions: 10.7x 3.3 mm; attains 12.5 mm (lip broken)."

Kilburn's description was based on a series of over 100 damaged specimens recovered from a reclamation dump in Durban Harbor, Natal, South Africa. He adds that the Natal specimens agree with BM(NH) syntypes of *Scala xenicima*, but generally have feebler spiral striae and less distinct "brown zonations" than examples from the northern Indian Ocean.

When Helen DuShane (1990) published the new geographical extension of "*Amaea*" *xenicima*, she followed Kilburn in his generic and subgeneric designation. However, she states in the discussion, "one wonders why Kilburn placed it in *Amaea* since it lacks the typical amaeid characters."

The supraspecific taxa of the Epitoniidae, almost exclusively based on shell morphology, have been treated differently by different workers. Some have placed many of the higher taxa into synonymy, while others have given generic value to subgenera, and vice versa. This is partly due to the subjective nature of supraspecific taxa, compounded by the unusual homogeneity of form in the family as well as the overlapping of shell characters between two or three different supraspecific taxa. This is the case of "*Amaea*" *xenicima*.

As Helen DuShane has pointed out, this taxon does not have the characteristics of *Amaea*. Moreover, *Aclis acuminata* 'H. & A. Adams' [= *Scalaria acuminata* G. B. Sowerby II, 1844], the type species of *Acrilla*, is highly acuminate, is profusely sculptured with rounded axial costae that are about as wide as

Figures 1-6. ***Gyroscala xenicima*** **(Melvill & Standen, 1903).**

1. Sally Kaicher's photograph of a syntype (BMNH).

2. Specimen from New Caledonia, Baie de St. Vincent, 21°53'S, 165°50'E, at 14 m. Length, 18 mm (Table II) (MNHN).

3. Close-up of same, showing axial and spiral microsculpture.

4-5. Specimen from New Caledonia, Baie de Touho, 20°46.7'S, 165°13.7'E, 3-6 m, in silty sand. Length, 7.7 mm (Table II) (MNHN).

6. Partial protoconch of same.

Figures 7-9. ***Gyroscala turnerae*** **(Altena, 1971). Specimen from the Delray Beach restoration project, Palm Beach Co., Florida. Dredged in sand at 27 m. Length, 20.1 mm (Table I), Sunderland coll.**

7. Ventral view.

8. Close-up of axial and spiral microsculpture.

9. Partial protoconch of a 6.8 mm shell (Sunderland coll.).

the interspaces, has numerous whorls, and has a rather obvious basal disk, not only a basal ridge, in mature specimens.

The epitoniid taxon *Scala xenicima* was presumably placed in *Amaea (Acrilla)* because of the weak spiral striae that appear between the axial ribs. Although the taxonomic value of spiral sculpture has not been established, it has been taken into consideration by most recent workers, together with other characters, and used at the subgeneric level. The presence of inconspicuous spiral striae in "*Amaea*" *xenicima* does not appear to be enough of a difference to place it in *Amaea* (*Acrilla*). Essential shell characters of "*Amaea*" *xenicima*, such as general shape, strongly convex whorls, glossy surface, and sharp basal ridge cleanly crossed over by axial costae, seem to indicate that this taxon is closest to the genus *Gyroscala*, which I treat here as a full genus following DuShane (1990), Kilburn (1985), and others. I view the unusual secondary sculpture as a distinctive character at the species level only.

The type species of *Gyroscala* de Boury, 1887 is *Scalaria commutata* Monterosato, 1877 [= *Scalaria lamellosa* Lamarck, 1822]. Although species belonging to the Epitoniidae are not known for having a circumglobal distribution, the well-known exception is *Gyroscala lamellosa* (Lamarck, 1822). It is found from the Bahamas (Redfern, 2001) and Florida and the Caribbean (Clench & Turner, 1951:281; Díaz & Puyana, 1994:154), to the Mediterranean, tropical west Africa, South Africa, and throughout the Indo-Pacific (Kilburn, 1985) to California (DuShane, 1983). Clench & Turner (1951) and DuShane (1990) write that the species has two protoconch whorls, however Kilburn (1985: 261) states that it has three. Protoconch whorls in the Epitoniidae are easily eroded, and often inconspicuously so because no obvious fracture may be evident and the apex may be sealed with newer shell material. This leads to a miscount of whorls. Although *Gyroscala lamellosa* is usually described as having smooth whorls, a specimen from Malta in my collection shows some obvious spiral striations under magnification.

The circumglobal distribution of *G. lamellosa* exemplifies at least the possibility that essentially tropical epitoniid species can survive the colder waters off the Cape of

Good Hope, South Africa, and establish themselves in the Atlantic Ocean. At least 20 Indo-Pacific species, particularly in the Ranellidae have been inferred to have done so (Vermeij & Rosenberg, 1993), including the rather recent report of *Cymatium pfeifferianum* (Reeve, 1844) and *C. gallinago* (Reeve, 1844) (Piech, 1993). *Gyroscala lamellosa* reaches as far south as Espirito Santo, Brazil, but most amphi-Atlantic species have not been found south of Bahía de Todos os Santos, Brazil.

Although most IndoPacific epitoniid species have not been able to survive the colder waters of South Africa, *G. xenicima* thrives there according to Kilburn's finds. Moreover, the species has demonstrated its ability for dispersal by inhabiting most of the Indo-Pacific region, from Hawaii to South Africa. *G. turnerae* has demonstrated a similar ability, having been found from the subtropical south to the subtropical north in the western Atlantic.

Although Rosenberg ("Malacolog"), Díaz & Puyana (1994), and others restrict this species to the northern coast of South America, Weil et al. (1999), extend it to Florida. This is confirmed by specimens in my collection, as well as in the collection of Dr. Harry G. Lee of Jacksonville, Florida, and Mrs. Betty Jane Peak of Lubbock, Texas. Mr. Kevan Sunderland of Sunrise, Florida, has recovered numerous specimens from spoil deposits in the Dania Beach restoration project in Delray Beach, Palm Beach Co., Florida. Moreover, I have inspected a specimen collected by Mr. José Carlos Tarasconi, a Brazilian collector, in the beach drift in Salvador, Bahía de Todos os Santos, Brazil. This specimen is now in the collection of Dr. Harry Lee. I have also inspected four beach worn specimens of the same taxon collected by Mr. Philippe Maestrati, of MNHN, at Despacho Beach, Itaparica Island, also in Bahía. The Brazilian specimens are slightly narrower than those from Delray Beach, Florida (Table I).

C. O. van Regteren Altena noticed the similarities between *Gyroscala lamellosa* and his new taxon, which he named *Epitonium (Gyroscala) turnerae*, and described as follows:

> Shell reaching about 12 mm in length, imperforate and possessing several costae (the holotype on the last whorl about 20, on the penultimate about 14), which are at first blade-like (at the suture of the previous whorl), but soon becoming thread-like; more or less bending, at first inward, on the second half outward. They differ in distance, some are more distinct than others and they are not in line with those of the previous whorl. With a magnifying glass of 10x or more, numerous small lines are to be seen on the last whorl. Number of whorls about 11 or 12, convex and attached; about 3 larval whorls without sculpture. Spire forming an angle of about 25° to 30°.
>
> Colour whitish, with brownish bands along the upper and lower sutures, mostly only on the body whorl.
>
> Aperture subcircular, the outer lip following the last costae: the first half bending inward, the second half outward. In the holotype, the only specimen in which the mouth is practically intact, the outer lip becomes thicker by some costae which are closely joining. No varices. The parietal wall and the columella form the continuation of the outer lip by having a thin callus.
>
> Basal ridge well developed, about as thick as the costae and sometimes visible on one or more previous whorls. Then the costae have just at the basal ridge a sharp angle forward. Operculum unknown.
>
> The holotype measures 9.8 mm in length by 3.9 mm in width and has earlier whorls missing.

Altena's description, in spite of stylistic differences, is very similar to those of Melvill & Standen and Kilburn. In order to understand the relationship between the two taxa, relevant shell characters of *G. xenicima*, as described by the original authors and re-described by Kilburn, will be compared below with those of *G. turnerae*, as described by Altena. Shell characters of both taxa from specimens I have personally studied (Tables I and II) will also be considered.

COMPARISONS:

Length: Melvill & Standen state that their largest specimen of *G. xenicima* is 14 mm, while the largest in Kilburn's series is 12.5 mm. However, a specimen at MNHN (Figure 2) measures 18 mm, even though it has a thin, broken lip. Presumably, the species will grow to a larger size. Altena establishes the maximum size of *G. turnerae* at 12 mm, but again a number of specimens in the Sunderland collection surpass that mark (Figure 7; Table I). The largest, apparently a fully adult specimen, measures 23 mm. The size difference between the two taxa is insignificant.

Width/length ratio: Melvill & Standen's stated measurement of *G. xenicima* has a ratio of 0.375, Kilburn's, 0.308, and the New Caledonia specimens average 0.382. Altena's holotype of *G. turnerae* has a ratio of 0.397, and the average of the 12 specimens studied (Table I) is 0.378. The Brazilian specimens are narrower than the other populations. At a ratio of 0.347 they are closer to Kilburn's. The ratios of w/l of Indo-Pacific and of western Atlantic populations are indistinguishable.

Protoconch: Melvill & Standen counted "2.5 whitish, glassy, smooth protoconch whorls", and Kilburn counted "4 slightly convex whorls, apparently smooth." The discrepancy in whorl count between the original authors and Kilburn is presumably caused by unobserved missing early whorls due to normal shell repair. While the larger of the MNHN specimens of *G. xenicima* has a missing protoconch, the two smaller have a partial protoconch of about two white, semitranslucent, slightly convex, smooth whorls, with a light tan line at the suture, immediately before the beginning of the first teleoconch whorl (Figure 6). Altena counted "about 3 larval whorls, without sculpture." His specimens were, by his own account, of poor quality, and may have possibly been also miscounted. While most of the specimens studied have a missing protoconch, a small specimen (Sunderland coll.), measuring 6.8 mm and not included in Table I, has a partial protoconch of about two smooth, glassy, slightly convex whorls, with a light tan line at the suture, immediately before the beginning of the first teleoconch whorl (Figure 9). However, this is not a diagnostic feature since a

TABLE I: Pertinent statistics of 12 specimens of *Gyroscala turnerae*, 10 from Delray Beach, east Florida, and one each from Salvador and Itaparica Island, Bahía State, Brazil. About two or three teleoconch whorls are missing from all but the two smallest specimens; missing whorls were not included in measurements when preparing this table.

Locality	Length	Width	# of whorls	# of costae on whorls		
				6th	7th	8th
Itaparica	7.4 mm	2.7 mm	7	17	16	
Delray	7.7 mm	3.5 mm	6	10		
"	8.2 mm	3.8 mm	6.5	10		
"	10 mm	4.3 mm	6.5	9		
Salvador	11.5 mm	4 mm	8	14	16	17
Delray	12.8 mm	4.3 mm	8.5	15	16	17
"	13.4 mm	5.3 mm	7	9	9	
"	16.0 mm	6.3 mm	8	10	9	10
"	16.5 mm	6.2 mm	8	10	8	8
"	19.8 mm	7.2 mm	8.5	10	11	11
"	20.1 mm	7.2 mm	8	10	10	11
"	23.0 mm	8.1 mm	8	Eroded	Eroded	11

TABLE II: Pertinent statistics of 3 specimens of *Gyroscala xenicima* from New Caledonia, housed at MNHN, Paris, France. Largest specimen has about two or three teleoconch whorls missing; missing whorls were not included in measurements when preparing this table.

Length	Width	# of whorls	Costae on whorls		
			6th	7th	8th
5.7 mm	2.3 mm	5.5	10		
7.7 mm	3.0 mm	7	11	11	
18 mm	7.0 mm	8.5	11	14	17

number of other epitoniid species with color on teleoconch whorls also have a tan or brownish line at the protoconch suture.

Teleoconch whorls: Melvill and Standen describe the teleoconch whorls as "ventricose", 11-12 whorls in a 14 mm specimen; Kilburn as "evenly convex", "about 10" in a 12.5 mm specimen; and Altena as "convex", "about 11 or 12" in a 12 mm specimen. These descriptions are basically identical. Tables I and II show the measurements of the specimens I have studied. Taking into account the missing early teleoconch whorls, presumably two or three in number, most specimens fit the descriptions above.

Sculpture (Figures 3 and 8): Axial sculpture is described by Melvill & Standen as "irregular … sharp, very thin" costae; by Kilburn as "very narrow and sharp, widely spaced, strongly arcuate, markedly sinuous on body whorl"; and by Altena as "at first blade-like…but soon becoming thread-like; more or less bending, at first inward, on the second half outward. They differ in distance, some are more distinct than others…" Altena's description incorporates all the characters detailed by Melvill & Standen and Kilburn. The number of axial costae per whorl is not mentioned by Melvill & Standen, Kilburn counted 10-13 per whorl. The two smaller specimens that I studied (Figures 4 and 5, Table II) follow that count while the 18 mm specimen (Figure 2) has 17 costae in the last whorl. Western Atlantic shells are somewhat more variable, even within the Delray population (Table I). Some specimens of *G. turnerae*, including Altena's own type material, have as many as 17-20 costae in the body whorl; however; most do agree with Kilburn's count of 10-13. Although not detected by Melvill & Standen, Kilburn, or Altena, there appear in both taxa, under magnification, irregular axial striae between the costae. These occur only in later whorls of larger specimens, but this may be due to erosion. When they occur, the striae create an uneven grid on the surface of the shell when they cross the spiral sculpture (Figures 3 and 8).

The spiral sculpture is consistent in the descriptions by the three authors, demonstrating that, at times, they are dealing with worn specimens. The description of the basal ridges also well matched, particularly so in Kilburn and Altena: Kilburn states that the basal ridge of *G. xenicima* shows "above sutures on spiral whorls", and Altena describes that of *G. turnerae* as "sometimes visible on one or more previous whorls."

Color: Melvill & Standen only state that the color is "livid-brown", while Kilburn describes it as "yellowish-white to light brown, rarely with obscure brown zones", and later on adds that the Natal specimens have less distinct "brown zonations" than examples from the northern Indian Ocean. A syntype of *G. xenicima*, housed at the BM(NH) and pictured by Kaicher(1980) (Figure1), shows a color pattern of two irregular dark zonations with a central band of irregular whitish spots. This pattern is clear in the three specimens of *G. xenicima* from New Caledonia I have studied. The smaller specimen has the "yellowish-white" color described by Kilburn while the two larger have the "livid-

brown" color described by Melvill & Standen (Figures 2, 4 and 5). Altena described his taxon as "whitish, with brownish bands along the upper and lower sutures." The color pattern of the specimens of both taxa at my disposal perfectly match each other (Figures 2 and 7). The intensity of the color varies in the Delray Beach population, and is probably due to the amount of fading that has occurred. The central, mottled, whitish band varies in width and definition. As expected, it is less distinct in more faded specimens.

Habitat: Although dead specimens of both taxa have been found in rather deep water, it seems that their habitat is in relatively shallow water. One of the original lots of *G. xenicima* was collected in 10 m, and the two lots from New Caledonia were collected in 3-6 m and in 14 m. Moreover, Kilburn's nearly 100 specimens recovered from the reclamation dump in Durban Harbor seem to indicate a shallow-water habitat. It also indicates that the species, although difficult to find, lives gregariously in the proper habitat. Interestingly, most of the available specimens of *G. turnerae* collected by Mr. Sunderland were obtained under similar circumstances, in dredged spoils deposited for beach restoration in Delray Beach, Florida. The numerous specimens collected indicate the same gregarious behavior as *G. xenicima*, as well as a shallow habitat, since the dredged material came from about 25 m of water. Díaz & Puyana have confirmed a shallow water habitat for the northern South American population.

CONCLUSIONS:

The genus *Gyroscala* includes few epitoniid species. Also rare in the family are species that have colored designs. *Gyroscala xenicima* inhabits a large geographical area of the Indo Pacific, from Hawaii to South Africa. *G. turnerae* extends from Brazil to Florida. Both of these taxa are identical in their shell morphology, distinct coloration and a microsculpture unique in the genus *Gyroscala*. Considering these traits, the concept of similarity by convergence is extremely improbable. Although I was unable to do conclusive protoconch comparison, it is my view that *Gyroscala turnerae* (Altena, 1971) is a junior synonym of *G. xenicima* (Melvill & Standen, 1903).

ACKNOWLEDGEMENTS: My deepest thanks to Dr. Philippe Bouchet, of the Muséum National d'Histoire Naturelle, Paris, France, for inviting me to study its epitoniid collection. It was the finding of *G. xenicima* in the Museum's material that inspired me to write this paper. I would also like to thank Dr. Harry G. Lee of Jacksonville, Florida, Mr. Philippe Maestrati of MNHN, Mrs. Betty Jane Peak of Lubbock, Texas, and Mr. and Mrs. Kevan Sunderland of Sunrise, Florida, for the loan of specimens from their collections, without which this study could not have been carried out. Dr. Lee was also kind enough to read this work and give me some helpful suggestions. Dr. Gary Rosenberg, of the Academy of Natural Sciences of Philadelphia, gave his support by providing me with indispensable literature.

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2003 SHELL SHOWS (Cont'd from page 20)

Sept. 26-28 - **Annual German Shell Fair**, Oehringen, Germany
Kurt Kreipl, Hoehenweg 6
D-74613 Oehringen-Cappel, Germany
(7941) 62-826, fax: (7941)2065.
E-mail: meeresmuseum@t-online.de

Oct. 26 - **British Shell Collectors' Club Shell Show,** London, England
Napier Hall, Hide Place & Vincent Street
Kevin Brown, 12 Grainger Road
Isleworth, Middlesex TW7 6PQ, England (181) 568-8333

Oct. 25-26 - **Sea Shell Searchers Shell Show,** Lake Jackson, Texas
The Lake Jackson Civic Center
Wanda Coker 332 Banyan
Lake Jackson, Texas 77566 (979)297-0852
E-mail: sdcoker@brazosport.cc.tx.us

Nov. 1-2 - **Philadelphia Shell Show,** Philadelphia, PA
Academy of Natural Sciences, Parkway & 19th St.
Al Schilling, 419 Linden Ave.
Glenside, PA 19038 (215) 886-5807
E-mail: alsch@bellatlantic.net

Nov. 8-9 - **Prague Shell Show**, Prague, Czech Republic
Mensa van de Economische Universiteit, Italská Str., Prague
Jaroslav Derka, Holeckova 51/370
15000 Praha 5, Czech Republic 42 (2) 5731 6246
E-mail: jderka@volny.cz

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Of Sundials and Murex

by Peggy Williams

On a recent trip to West Mexico I reconfirmed a couple of previous observations. Reading shell books I learned that some species of Architectonicidae live among sea anemones - the kind that grow so closely together they form a mat (called "mat anemones") and are in the genus *Zoanthus*, at least in the Caribbean. Several years ago, at an island off La Paz, Baja California Sur, I happened to be at the right place at the right time, just as the tide was coming back in after an exceptional low. I happened on an area of mat anemones and there were sundials - *Heliacus bicanaliculatus* (Valenciennes, 1832) just emerging from their "nap" during low tide down among the anemones. They came up on their sides, having been spire-side down while resting, then turned spire-side up. In an area of about three feet square, we found over 70 of them!

On later trips to Baja I hunted out mat anemones and have always been able to find a few *Heliacus* each time, including this year's trip. Never have I had such a bounty as the first time, however. I've looked in the Caribbean as well, but never until last year found living *Heliacus*.

This time was in Brazil, in Salvador, at a rocky headland. The mat anemones were covering the rocks at lowest tide line, and I found not one, but two species of *Arcitectonica*: the cognate of *Heliacus bicanaliculatus*, *Heliacus cylindricus* (Gmelin, 1791) and *Heliacus perrieri* (Rochebrune, 1881). As a bonus, hiding among the mat anemones were several *Coralliophila aberrans* (C. B. Adams, 1850).

The operculum of *Heliacus* is unique, thick and pyramid-shaped on the outside and hooked on the inside. One of the shellers thought it was a crab!

Heliacus bicanaliculatus emerging from mat anemones.

Haustellum ruthae egg mass

Two *Heliacus bicanaliculatus*

Haustellum ruthae in egg mass

Also from reading shell books I know that many species of Muricidae gather together to lay eggs. I've seen many *Muricanthus nigritus* (Philippi, 1845) with another individual's purple egg cases attached to them. At Bahia Concepción in Baja I have several times found egg masses blown high on shore and pulled them apart to reveal several *Haustellum ruthae* Vokes, 1988, dead within the egg cases, complete with opercula. On one trip, nine of us pulled at a yard-wide egg mass to our heart's content, finding over 200 shells (I myself had 49) and we left one of our number happily pulling out even more when the rest of us tired of it!

Only once have I found such an egg mass in the Caribbean, on Margarita Island in Venezuela, where I found one *Haustellum chrysostoma* (Sowerby, 1834) within the egg mass. However, I was able to witness an egg-laying frenzy of *Haustellum messorius* (Sowerby, 1834) in Belize while snorkeling in a quiet lagoon. Animals were gathering from all compass points to add their eggs to the growing mass, already about nine inches across, with about six of them actively laying at any one time. I left most of the shells there, taking only a few that were crawling away after laying.

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1. *Heliacus bicanaliculatus* (Valenciennes, 1832). Surf zone on green carpet anemone, El Requeson, Baja Sur, Mexico, 15 mm.
2. *Heliacus cylindricus* (Gmelin, 1791). Intertidal in rock rubble, Salvador, Brazil, 11 mm.
3. *Heliacus perrieri* (Rochebrunne, 1881). Intertidal in rock rubble, Salvador, Brazil, 11 mm.

The Bailey-Matthews Shell Museum

(Thanks From COA!)

The Bailey-Matthews Shell Museum began as an idea among several residents of Sanibel Island during the mid 1980s. Individual and shell club support, money-raising projects, incorporation, expert advice (R. Tucker Abbott among others) – all followed from the initial spark of $10,000 donated by local shell collector Charlene McMurphy. In 1990, Samuel and John Bailey donated eight acres of land along the Sanibel-Captiva highway for the museum. The donation was made in their parents' names, Frank P. Bailey and Annie Mead Matthews – thus the museum name. Lots of local, state, and federal government red tape, bank loans, and a mound of permits later, construction began in 1994 and the doors opened in 1995. The official opening was two weeks after the death of Dr. Abbott, but he was seen by millions before the opening as he stood in front of the museum and was interviewed on a national talk show.

By early 1996, after reviewing several highly qualified candidates, Jose H. Leal, Ph.D. was hired as the museum scientific director. Dr. Leal was then able to guide the museum as it grew.

Above is the exterior of the Bailey-Matthews Shell Museum on Sanibel Island, Florida, U.S.A. Opened in 1995 and host to thousands of visitors each year.

Below is a docent working with visiting youngsters. The kids are learning about shells, marine life, and ecology in the museum's Children's Learning Lab.

Under his stewardship the museum launched a number of educational, scientific, and out-reach programs; ensured museum facilities for researchers; established a growing research library; continues to build an extensive shell collection (150,000+ lots); and became publisher of the Nautilus – the oldest English language malacological publication (begun in 1886). Dr. Leal has provided the enthusiasm, knowledge, and just plain hard work that have been largely responsible for the museum's successes. He is quick to credit staff and volunteers for the museum's success.

The latest project at the museum is an agreement between the museum and COA. Dr. Leal has graciously agreed to have the museum act as archival agent for COA and keep the albums from COA conventions on file at the museum. The albums date from the 1972 convention and contain photographs and memorabilia that provide a rare history of COA members and convention events through the years. Previously they were maintained at the home of COA historian Mary Ruth Foglino. These albums (another will be added each year) will now be under the curatorial management of the museum and will be readily available to any interested COA members. Thanks from COA to Dr. Leal and the Bailey-Matthews Shell Museum. The museum is on the web at: http://www.shellmuseum.org/

Museum contact:

Libby Grimm
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The Bailey-Matthews Shell Museum
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Above is the exhibit Florida Fossil Shells and a young visitor taking notes.

Below is a table top sailor's valentine on display. This use of shells as a decoration was just one of many such uses popular in the 17th and 18th centuries.

Below is one of the recent additions to the museum web page "S.W. Florida Shells," a 22 mm nudibranch, *Learchis poica* Marcus & Marcus, 1960.

Shell Collecting in Iceland Part II: The Low Tides

Moshe Erlendur Okon
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The cycle of high and low tides in Iceland can be best demonstrated by the occasional stranding of people on the tiny island of Grota – one of my favorite collecting spots in West Iceland. During the ebb tide one can usually walk onto the island from the mainland shore, but neglecting to observe the flow may render the unsuspecting visitor a prisoner in need of rescue.

The lighthouse on Grota with tidepools under the kelp below. Photo by M.E. Okon.

This tide cycle lasts for twelve hours and twenty-five minutes, and therefore the low tide hours (twice a day) change. The extent of the high and low tides depends upon several factors such as the time of year (i.e. the position of the moon and sun - causing spring or neap tides), wind direction and velocity, sea currents, temperature, and atmospheric pressure. In March, the difference between the low and high tide marks can reach over four meters.

The low tides offer shell collectors several opportunities: combing sand and mud flats, rummaging through beach drift brought in by storms, picking shells out of tide pools and off kelp, and searching for those mollusks that prefer living under rocks at the very edge of the water line. One hardly ever meets shell collectors on the shores, but on bright days, Asian women come searching for crabs and whelks for dinner. On one lucky occasion, I encountered a seal calmly watching me as I was busy overturning rocks.

As the temperatures in winter can reach well below freezing, one might need some kind of instrument to break the upper frozen layer of seawater in the tide pools. Inserting one's hand to fish out something can be extremely painful due to the cold and wind. Using gloves and a ladle is a good idea, but requires some practice. In the summer, one risks being attacked by aggressive nesting Arctic terns if one gets too close to their breeding spots on Grota.

Mud flats are common and can be found all around Iceland. They yield mostly bivalves, several of which are edible and abundant. Many kinds of birds can be seen on the flats feasting on the exposed mollusks. Shells I have found here include: ***Arctica islandica*** (L., 1767), ***Astarte borealis*** (Schumacher, 1817), ***Cerastoderma edule*** (L., 1758), ***Macoma calcarea*** (Gmelin, 1791), ***Mya arenaria*** L., 1758, ***Mya truncata*** L., 1758, ***Mytilus edulis*** L., 1758, and ***Zirfaea crispata*** (L., 1776).

Tide pools host a variety of sea life such as barnacles, lichens, seaweed, algae, kelp, arthropods, starfish, jellyfish, worms, sea urchins and small fish. On a bright day, the colors in the pools can be truly fascinating with green, pink, red, yellow, brown, black, white and blue. Pools closer to the upper tide mark yield a number of species such as: ***Nucella lapillus*** (L.,1758) and ***Buccinum undatum*** L., 1758. Both of these mollusks have many forms and are quite variable in size, color and shape (see Part I in this series, December 2002, for forms of ***N. lapillus*** and the article on ***Buccinum superangulare***, September 2001, for a discussion of ***B. undatum*** forms). These two shells are often hosts

Closeup of the masses of kelp washed on shore after a storm. Photo by M.E. Okon.

to the hermit crab ***Eupagurus bernhardus***.

Overturning rocks still submerged in water in the pools closer to the lower tide mark will usually prove very productive. Apart from the occasional deeper water species sometimes washed into these pools, one will most likely find: ***Ichnochiton albus*** (l., 1767), ***Tonicella marmorea*** (Fabricius, 1780), ***Acmaea testudinalis*** (Moeller, 1776), ***Acmaea virginea*** (Moeller, 1776), ***Margarites helicinus*** (Fabricius, 1780), ***Onoba aculeus*** (Gould, 1841).

Another method of finding shells here is to examine the abundant seaweed growing on the rocks. There are several kinds of seaweed and when exposed during the low tide they yield: ***Lacuna pallidula*** (da Costa, 1778), ***Lacuna vincta*** (Montagu, 1803), ***Helcion pellucida*** (L., 1758), ***Littorina fabalis*** Turton, 1825. ***Littorina saxatilis*** Olivi, 1792 can usually be found on rocks at the high tide mark.

Winter storms in Iceland can be quite harsh with winds blowing at over 150 kph. Tons of kelp are washed ashore and pile up until the high tides eventually wash them back into the sea. Buried in this kelp one can find several species: ***Serripes groenlandicus*** (Bruguiere, 1798), ***Modiolus modiolus*** (L., 1758), ***Musculus laevigatus*** (Gray, 1824), ***Neptunea despecta*** (L., 1758), ***Boreotrophon truncatus*** (Strom, 1768). Breaking open the kelp fasts is not always easy, but can reward one with large ***Hiatella arctica*** (L., 1767).

All in all, these cold waters contain quite a few interesting species. While generally not as colorful as tropical species, they have their own appeal and Iceland remains one of my favorite collecting spots.

Above: Top row (left to right): *S. groenlandicus, C. edule, M. truncata*; middle row: *M. calcarea, A. borealis, M. arenaria* (72mm); bottom row: starfish *Henricina sanguinolenta, Ophiopholis aculeata, Asterias rubens*. Coll. M.E. Okon, photo Dan Karmeli.

Below: Top row (left to right): *E. bernhardus* hiding in *B. undatum, A. testudinalis* and the sea urchin *Strongylocentrotus droebachiensis*; second row: *L. vincta, L. pallidula, H. pellucida, H. arctica*; bottom row: *I. albus, T. marmorea, B. truncatus, M.laevigatus* (30mm). Coll. M.E. Okon, photo Dan Karmeli.

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Quarterly Journal of the Conchologists of America

CONCHOLOGISTS OF AMERICA, INC.

Volume 31, No. 3 September 2003

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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President's Message

I hope everyone had a wonderful summer. It's hard to believe our week together in Tacoma was more than two months ago. I want to use this opportunity to thank a number of folks and groups for making my past year as President so much fun.

Speaking of Tacoma, I believe Tom Rice and his crew from the Pacific Northwest Shell Club did a terrific job. They truly outdid themselves, and each individual deserves special thanks for the hours of preparation and hard work that culminated in an event where we all felt at home. There were so many interesting things to do and see, as well as a lot of new shell collectors to meet. At the same time, it was good to see so many familiar faces. A special thanks also goes to Jim and Linda Brunner for their coordination of the auction items. This was another lucrative event and that means more money for educational grants.

As you are probably aware, the 2004 COA convention will be in Tampa, Florida. The convention locale is special and this promises to be another great convention with lots of activities and events. Thanks to Betty Lipe and the convention committee for all of their time and effort. Also, as announced at the general membership meeting in Tacoma, a thank you to Anne Joffe and her committee for taking on the 2005 convention. This will be in the Sanibel, Florida, region and I have already heard a number of exciting things about that event. More details on both conventions to follow.

My heartfelt thanks to the COA Board of Directors, the folks who do the administrative work and keep us on an even keel. With their guidance, caring, and occasional yelling (at me usually), they keep the organization moving in the right direction.

And now some great news and a special thanks to Donald Dan and his grant development committee who have been working hard on obtaining additional grant funding for COA. While some details still need to be worked out, since the Tacoma convention there have been two outside grant proposals to COA for a total of $15,000. Once finalized we will release more details; until then our patrons know who they are and how much we appreciate their thoughts and generosity.

Meanwhile, in good news – bad news fashion, the COA Walter Sage Fund received a $630.00 donation from the Louisville Shell club. Louisville has decided to disband but wanted the remnants of their treasury to support one of their favorite member's grant fund. Our deepest thanks for their thoughts and donation.

To Tom Eichhorst, my personal thanks and congratulations. You survived your first year and have done a wonderful job with American Conchologist. And as editor, Tom reminded me I have only a limited amount of space for this column, even though there are so many others who deserve thanks for their time and efforts in making our organization a success. Thank you each and everyone for your tremendous support and contributions. Our organization is only as successful as the membership makes it. You are all doing a tremendous job. Thanks and more later.

Tom Grace
President, COA

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Front cover: ***Archachatina marginata*** **(Swainson, 1821) in decaying vegetation, Sao Tome Island off west Africa. This is one of the giant species of the family Achatinidae, which includes the infamous giant African snail,** ***Achatina fulica*** **(Bowdich, 1822) This specimen has an intact periostracum and is just over 100 mm in length. See article on page 4.**

Back cover: ***Cirsotrema rugosum*** **Kuroda & Ito, 1961. This is a shell manufactured in the Philippines. These pieces are works of art and can be difficult to distinguish from the actual mollusk. This "specimen" is 163 mm in length, almost twice the world record.**

Jordan Star's Web Picks

☆ = poor, ☆☆ = fair, ☆☆☆ = good, ☆☆☆☆ = excellent, ☆☆☆☆☆ = outstanding

Feedback improves Web Picks. Some sites may not be "shell" specific, but of interest to shellers. The first site should get ten or more stars, but my rating system only goes to five stars.

☆☆☆☆☆ and more! - **eNature.com; http://enature.com/.** Excellent site with many, many photos. There is a field guide list, a list by zip code, and if you become a member you can make customized lists. I can spend all day at this site. The site has information on shells, seashores, mammals, ocean life, birds, etc. You deny yourself a great experience if you don't visit this site.

☆☆☆☆☆- Online Conversion - Convert just about anything to anything else; **http://www.onlineconversion.com/.** MegaConverter 2; **http://megaconverter.com/mega2.** Don't have an English to metric calculator? Go to these sites. I used the first site to add metric conversions for an article in this issue of *American Conchologist*. Besides metric conversions, you can convert area, volume, pressure, temperature, etc. Very useful for common and uncommon conversions. The first site also has a scientific calculator.

☆☆☆☆☆ - Sea and Sky: The Sea; **http://www.seasky.org/sea.html**. Well, half of this site is shell related, shells live in the ocean, right? Photos of ocean creatures and general information. This site is slanted toward a juvenile audience, but there is information for all.

☆☆ - Mollusk Collections @ AMNH; **http://research.amnh.org/invertzoo/mollusk/collections/**. No pictures, easy to navigate, is a list – nothing more. Good for researchers.

☆☆☆ - Coral Reef Creatures - Pacific and Red Sea Invertebrates; **http://reefimages.com/Invertebrates and Scenes.htm.** Small pictures, some shells, mostly other ocean creatures. All pictures are of live animals. Slide show section doesn't seem to work properly.

Links work as of 8-7-03

A New Old (or old new) Author in Malacology

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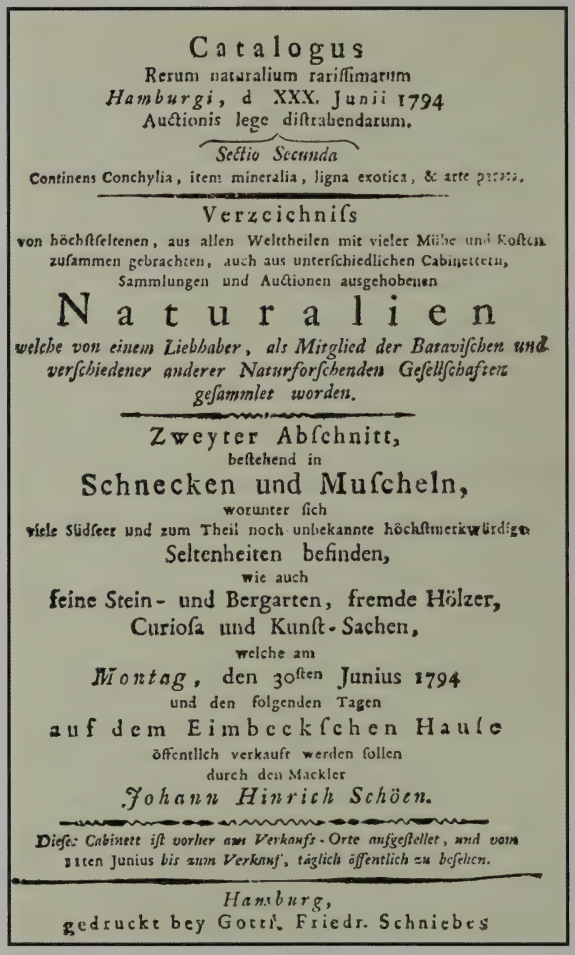
It is not too common to encounter a new author in malacology, particularly if the author published in the late 18th century. I introduce here the person and the works of Anton August Heinrich Lichtenstein (1753-1816), who wrote a series of sales catalogs (1793, 1794, 1796, 1797) as well as the introduction to the Bolten sales catalog by Röding (1798). But first, how does one discover a new work in malacology?

There were scattered references to the abalone species *Haliotis clathrata* Lichtenstein, 1794, hence, while researching the systematics of that family I had to find out more about this: the name, the work, and the person behind it. It proved difficult. I first came across the name in Roger Pickery's (1991) most valuable paper on abalone taxa. He had tried unsuccessfully to locate a copy of the work for quite some time. The perusal of several continental European libraries did not produce a copy. During a visit to the Natural History Museum, London, I enquired with Julia Freeman about the work, and lo and behold, the library catalog indicated the presence of the volume. Finally! However, it could not be located on the premises and I left with one task still to be completed. A few years later I visited the University of California at Berkeley, in order to learn molecular techniques from Charlie Wray in Dave Lindberg's Lab. I was able to stay with Rob Guralnick and left with many pleasant memories of my visit. During one of the slower times in the lab, I headed to the library. After I found most of what I was looking for, I tried on a whim to see what would come up under "Lichtenstein". After a number of volumes on Roy, there were some older titles. And finally the *Catalogus rerum naturalium rarissimarum sectio secunda continens conchylia, item mineralia, ligna exotica, & arte parata* (Fig. 1). It was a microfilm copy and Rob kindly offered to get it using his library card. To my greatest astonishment it was out on loan, to someone at the American Museum of Natural History, New York. I still don't know who it is and would be quite interested in getting in contact with that person.

A couple of months later, the microfilm arrived by interlibrary loan at my home base, then the University of Southern California, Los Angeles. In the end, it took over ten years to find a copy of this elusive work.

But who is this Lichtenstein? The standard work on malacological history, Dance's (1966) *Shell Collecting, an Illustrated History*, contains only a reference to the preface he wrote for Röding (1798). Through a number of literary references (for full details see Geiger, 2003), the following picture emerges about the Lichtensteins. Scott Jordan of San Diego kindly provided many of the leads.



Catalogus
Rerum naturalium rariſſimarum
Hamburgi, d XXX. Junii 1794
Auctionis lege diſtrahendarum.

Sectio Secunda
Continens Conchylia, item mineralia, ligna exotica, & arte parata.

Verzeichniſs
von höchſtſeltenen, aus allen Welttheilen mit vieler Mühe und Koſten zuſammen gebrachten, auch aus unterſchiedlichen Cabinettern, Sammlungen und Auctionen ausgehobenen

Naturalien

welche von einem Liebhaber, als Mitglied der Bataviſchen und verſchiedener anderer Naturforſchenden Geſellſchaften geſammlet worden.

Zweyter Abſchnitt,
beſtehend in
Schnecken und Muſcheln,
worunter ſich
viele Südſeer und zum Theil noch unbekannte höchſtmerkwürdige
Seltenheiten befinden,
wie auch
feine Stein- und Bergarten, fremde Hölzer,
Curioſa und Kunſt-Sachen,
welche am
Montag, den 30ſten Junius 1794
und den folgenden Tagen
auf dem Eimbeckſchen Hauſe
öffentlich verkauft werden ſollen
durch den Mackler
Johann Hinrich Schöen.

Dieſes Cabinett iſt vorher am Verkaufs-Orte aufgeſtellet, und vom 11ten Junius bis zum Verkauf, täglich öffentlich zu beſehen.

Hamburg,
gedruckt bey Gottl. Friedr. Schniebes

Fig. 1. The cover of the Lichtenstein catalog of 1794 from a microfilm copy held by the University of California, at Berkley. The 1794 catalog consisted of shells and minerals and was 118 pages. Sixteen new species were described, but most are unidentifiable due to the brief descriptions and lack of images.

Fig. 2 (above) is *Haliotis elegans* Philippi, 1844. This is a junior synonym of *Haliotis clathrata* Lichtenstein, 1794. Fig. 3 (below) is *Haliotis clathrata* Reeve, 1846, a junior homonym of *Haliotis clathrata* Lichtenstein, 1794. The Lichtenstein name, even though senior to the Reeve and Philippi names, was suppressed to preserve the two junior, but well-known taxa.

The Lichtenstein family consisted of several well-known naturalists of the eighteenth and nineteenth centuries. Anton August Heinrich Lichtenstein (1753-1816) was a doctor of theology and philosophy, professor of oriental languages, and from 1782 onwards, principal of the famous Johanneum in Hamburg (founded 1529 and still an elite high school today). He was also an out-of-town member of the *Gesellschaft der Naturforschenden Freunde* in Berlin. He was a library assistant (1794-1796) and the director (1796-1798) of the public library of Hamburg. In 1798 he was appointed professor at the University Helmstädt. His brother (?) Georg Rudolph Lichtenstein (1745-1807) was a physician and became an associate professor at the University Helmstädt. He is noted for his considerable herbarium of over 45,000 specimens. One of A. A. H. Lichtenstein's sons, Martin Heinrich Karl Lichtenstein (1780-1857), was a well-known ornithologist and held positions as a professor of zoology at the University of Berlin as well as the director of the Zoological Museum of Berlin. Three plant genera were named in his honor. A.A.H.'s other son, August Gerhard Gottfried Lichtenstein (1780-1851), produced an index of plant genera. The importance of the work of the Lichtenstein dynasty is witnessed by the 36 species epithets for animals described in their honor as listed in Sherborn (1922).

Lichtenstein wrote three sales catalogs that included several species descriptions: in 1793 one on mammals and birds, in 1794 one on shells, and in 1796 one on insects. The series of catalogs were produced for an auction of an important collection of natural history objects. The person whose collection was sold was not mentioned, but must have been a significant collector. He is described as a member of the "Batavischen" (old name for Jakarta, Indonesia) as well as other natural science societies, who had obtained a large quantity of specimens from all over the world. The collection could be attributed to L. F. Holthuisen, a wealthy collector from Amsterdam. No shell has thus far been traced to that collection.

Fig. 4. *Conus nobilis victor* Broderip, 1842. Still a valid taxon, despite the earlier name by Lichtenstein.

23

Conus - *Capitaneus*. Käſe - Tuten. Gmel. ſp. 6.

52 Eine grüne Käſe - Tute. Mart. 2. t. 59. f. 660 - 62. Knorr 1. t 7. f. 6.
53 Zwey braune dito.
54 Zwey Hermelin - Schwänze. Mart. 2. t. 57. f. 630. 31.
55 Zwey gelbe dito.
56 Zwey blaſsgrüne Jagd - Kleider. (Hermelin - Pelze.) Chem. 10 t 138. f. 1280.
57 Ein ſehr ſelten gelbes dito, mit rothgefleckte Banden.

Conus *Miles*. Garn - Tuten. Gmel. ſp. 8.

58 Zwey Arracans - Garntuten. Mart. 2. t. 59. f 663. 64. Knorr. 1. t. 15. f.
59 Zwey dergleichen.
60 Eine ſeltene gebandete Abart.

Conus *Ammiralis*. Admiral. ſp. 10.

61 ! Ein auserleſener ſehr ſchöner Ober - Admiral mit 3 Banden. Mart. 2. t. 57. f. 634. 35. Chem. 10. t. 141. f. 1307. Knorr. 4. t. 3. f. 1.
62 ! Ein dergleichen, eben ſo ſchön.
63 ! Ein dito, dito.
64 ! ! Ein dito, dito, durchgängig mit Afterbanden geziert, (höchſtſelten.)
65 ! Ein güldiſch gelber dito.
66 Ein eben ſo ſchöner Ober - Admiral mit 4 Banden. Knorr. 1. t. 8. f. 2.
67 ! Ein dergleichen, eben ſo ſchön.
68 ! Ein dito, dito.
69 ! Ein eben ſo ſchöner Ober - Admiral mit 5 Banden. Chem. 10. t 141. f. 1308.
70 ! Ein dergleichen dito.
71 ! Ein orangefarbiger dito
72 ! Ein ſehr ſchöner granulirter dito, mit 4 Banden.
73 ! Ein eben ſo ſelten ſchöner dito.
74 ! ! ! Conus *nobilis*; Gmel. ſp. 113. var. nova γ. *Vinco omnes* nobis. Conus pyriformis teſta ſubcylindrica lævi, cingulis duobis manifeſtis faſciata. Spira exquiſita, anfractibus ſubbicanaliculatis; margine

B 4

24

gine exteriore integerrimis, interiore tenuiſſime plicatis. Zonæ duæ conſtant, ſingula quæque ex faſciis octonis manifeſtis, quæ ex punctis fuſcis confertis attamen diſtinctis conflatæ; atque, ut color fundamentalis flavus totius teſtæ, maculis parvis, albis, plerisque rhombeis, ſtellarum vel nivis inſtar, ſparſis, elegantiſſime conſperſæ ſunt Eine edle Admirals - Tute, die Schaale iſt beynahe walzenförmig glatt, mit zwey auffallenden Quergürteln bandirt; der Wirbel läuft in eine erhabene Spitze aus, und iſt mit einer breiten und noch einer andern ſchmalen Rinne hohlgekehlt; die beyden Gürtel beſtehen jede aus acht deutlichen Querſtreiffen, welche aus braunen, nahe an einander ſtehenden und doch getrennten Puncten beſtehen; dieſe Querbanden ſind, wie die gelbe Grundfarbe der ganzen Schnecke, von der obern Spitze bis unten, mit kleinen ſauberen, mehrentheils rautenförmigen weiſſen Flecken, als zerſtreuten Schneeflocken, oder Sternchen bedeckt, welches dieſem Prachtſtück ein auffallendes Anſehen giebt.

75 Zwey glatte weſtindiſche Admirale. Mart. 2. t. 57. f. 640.
76 Zwey Vice - Admirale. Mart. 2. t 57. f. 639.
77 Zwey granulirte weſtindiſche Admirale. Mart. 2. t. 61. f. 679.
78 Zwey dergleichen.
79 Zwey dito dito.
80 Eine groſſe Reichs - Krone (Kayſer - Krone) vom erſten Rang 7½ Zoll. Mart. 2. t 53. f. 590.
81 Eine dergleichen 5 Zoll.
82 Ein vorzüglich ſchönes Exemplar 3½ Zoll, beſonders ſchön.

Conus *nobilis*. Gelbe Herz - Tute. Gmel ſp. 13.

83 Zwey ſaubere gelbe (goldene Herz - Tuten.) Mart. 2. t. 62. f. 689.

Conus

Fig. 5. Pages 23 and 24 from the Lichtenstein catalog. These pages deal with *Conus nobilis* var. *vincoomnes* Lichtenstein, 1794. This name is a senior synonym of *Conus nobilis victor* Broderip, 1842, but has been declared a *nomen oblitum* with the *Conus nobilis victor* name a *nomen protectum*. Thus the Broderip name in use for the last 150 years is preserved.

Sales catalogs are tricky with respect to zoological nomenclature and questions arising regarding publication requirements and with respect to consistently applied binominal names have to be addressed. Sales catalogs were often produced in low numbers, so that access to the work has been problematic throughout the ages. Röding's catalog is a perfect example and long established Lamarckian generic names were later superseded by the older Röding taxa. Hence, it was important to assess the validity of the catalog as a publication under ICZN requirements.

The preface is written in Latin and in German, printed on facing pages. The texts are identical, although the phrasing varies slightly in the two versions. Lichtenstein was careful to point out that he followed the new system of zoological nomenclature referring to "Gmelin's edition of the Linnean natural system" and "the Linnean system according to Gmelin's latest edition." All names are binominal with some trinominal subspecies. And the catalog was publicly available for purchase. Thus all publication and availability criteria are met. Furthermore, the catalog on mammals and birds is a well-known source of names in these areas, and it was necessary to obtain a ruling from the ICZN Commission to suppress the insect catalog, strengthening the independent assessment of its availability.

The catalog on shells and minerals was published in 1794. It contains 118 pages, of which seven are reserved for the preface. It is devided into several parts. The largest section on shells includes two shorter subsections on Multivalvia (barnacles, gooseneck barnacles: lots 1-6) and Bivalvia (bivalves, clams: lots 7-332). A new count was started for subsection Univalvia (snails:

lots 1-1327). A further 113 miscellaneous lots were added at the end.

Because the publication series was a sales catalog, the particularly rare and remarkable specimens were highlighted with one, two, or even three exclamation marks: "so has one then indicated the most noticeable pieces, that they stand out even better, with an adjacent exclamation mark." The main text of the catalog is written predominantly in German; only significant passages and the descriptions of the new taxa are given in Latin. Here, too, the contents are mostly identical, although some ambiguities in one language may be resolved through comparison to the other.

Sixteen new species were described in Lichtenstein's sales catalog. Most of them are impossible to identify given the brief descriptions, the lack of illustrations, and the absence of type specimens. The Lichtenstein names and their approximate identifications are given in Table 1. A complete discussion of the names and their possible identity is given in Geiger (2003).

Table 1

Lichtenstein name	Possible identity
Mya papyracea	Myidae?
Ostraea edulus var. *bracteata*	Bivalvia ???
Conus nobilis var. *vincoomnes* (nomen oblitum)	*Conus nobilis victor* (nomen protectum)
Conus lemur	*Conus* sp.
Conus lar	*Conus* sp.
Conus fritillaria	*Conus* sp.
Voluta daedalea	*Vexillum* sp.
Murex canistrum	*Drupa* sp. ?
Murex lycopersicon	*Thais* sp.
Murex australasiae	Caenogastropoda ???
Murex pacificus	Caenogastropoda ???
Trochus tahitiensis	*Trochus maculatus*?
Helix porphyrostoma	Pulmonata
Helix australasiae	Pulmonata
Helix cermelita	Pulmonata
Haliotis clathrata (suppressed ICZN opinion 1950)	*Haliotis elegans*

Two names are potentially interesting for shell collectors: *Haliotis clathrata* Lichtenstein, 1794 (non Reeve, 1846) and *Conus nobilis vincoomnes* Lichtenstein, 1794. *Haliotis clathrata* Lichtenstein, 1794, is a senior synonym of *Haliotis elegans* Philippi, 1844 (Fig. 2) and a senior homonym of *Haliotis clathrata* Reeve, 1846 (Fig. 3). The proposal to suppress *H. clathrata* Lichtenstein to preserve the two latter, well-known taxa was accepted under Opinion 1950 (2000: Bull. Zool. Nomencl. 57: 124-125) (Geiger & Stewart, 1998; Geiger, 1998). *Conus nobilis vincoomnes* deserves some further discussion.

Conus nobilis Linnaeus, 1758, is a well-known species from the Indian Ocean. The description of *C. nobilis vincoomnes* Lichtenstein, 1794, exactly fits *C. nobilis victor* Broderip, 1842 (Fig. 4), characterized by the two areas with multiple bands consisting of tightly spaced dark brown markings. The translation of the original description (Fig. 5) reads as follows:

> 74 ! ! ! Conus *nobilis* Gmelin (1791: sp. 113) new variety: *vincoomnes*, to us [= new species]. A cone with pear shaped shell, subcylindric light [should read levi: light instead of laevi: left], with two distinct banded girdles. The spire is exquisite, the [body] whorl with two weak grooves; the outer margin very complete/intact, the interior with very fine folds. The two zones consist, each of eight bands, which are composed of close yet distinct brown dots; additionally, so that the basic color of the entire shell is yellow, [they] are scattered elegantly with small white spots, mostly rhomb shaped, [and with] scattered stars or snow flakes.
>
> A noble admiral's horn, the shell is almost cylindrical smooth, banded with two prominent cross belts; the spire extends in an erect tip, and is keeled up with a broad and an other narrow furrow; the two belts consist of eight distinct cross bands each, which are composed of brown, closely adjacent and still separated dots; these cross bands are, like the yellow base color of the snail, from the upper tip to below covered with small clean, mostly rhomboid, white spots as dispersed snow flakes or stars, which give this exquisite specimen a noticeable appearance.

Both, Lichtenstein (1794) and Broderip (1842) compared their species to *C. nobilis* and *C. ammiralis*, further strengthening the identity of the two specific names, although no dimensions were given by Lichtenstein. Lichtenstein noted that this species is extremely rare with the three exclamation marks. The Indonesian *C. nobilis victor* is to this day an uncommon shell. The name *vincoomnes* had never been used in the literature, hence, was designated in Geiger (2003) a *nomen oblitum*, with *C. nobilis victor* a *nomen protectum*. The conditions to establish a *nomen protectum* (ICZN Art. 23.9.2: senior synonym not used as valid name after 1899 and junior synonym cited in at least 25 works by 10 authors during the immediate preceding 50 years spanning at least 10 years) are met.

Note the similarity in the species names (victor = the winner; vincoomnes = I win all), which may allow some speculation on the origin of Broderip's material. Broderip (1842) had two specimens at his disposition, one from I. H. Cuming, the other from the Reverend A. Harford, whereas Lichtenstein based his description on a single specimen. The two Broderip specimens have equal standing as syntypes. Finet and Caillez (1993) inaccurately called the specimen shown in their fig. 5 "Holotype BMNH 1992085"; the whereabouts of the second specimen is not known. Gary Rosenberg (pers. comm.) kindly pointed out that the holotype indication does not constitute a so-called inadvertent designation of a lectotype, because Broderip clearly referred to two specimens (ICZN Art. 74.5-6). The name given by Broderip (1842) may also be seen in the context of naming a small, rare,

and finely patterned species akin to *C. cedonulli* Linnaeus, 1758. The latter species epithet signifies "I cede to none" or, as Dance (1966) phrased it, "second to none". Accordingly, *C. victor* and *C. vincoomnes* could have been named independently in that tradition, though there is no indication of such an intent in either of the original descriptions.

Over a decade after my initial curiosity was kindled, the life and work of A. A. H. Lichtenstein has been somewhat illuminated. Clarifications on the unresolved points may be forthcoming, but the identity of some of Lichtenstein's names may forever remain in obscurity. The entire Lichtenstein catalog is now available on the World Wide Web under <http://www.vetigastropoda.com/Lichtenstein>, hosted by the Santa Barbara Museum of Natural History. It includes facsimile reproduction of digitally cleaned up pages as well as a tentative translation of the original text to English. Some of the translations are not quite satisfactory at present and comments, suggestions, and corrections will be most welcome. Those of Gary Rosenberg, Rüdiger Bieler, Scott Jordan, Niko Malchus, Thomas Eichhorst, and Alan Kabat are kindly acknowledged.

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New Mangrove Forests May Threaten Coral Reefs

As reported in New Scientist

http://www.newscientist.com

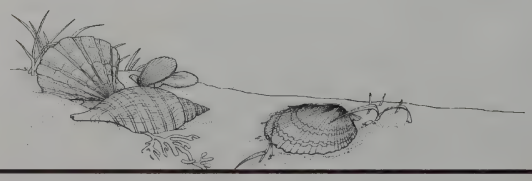
Mark Spalding, co-author of the UN sponsored book *World Atlas of Coral Reefs*, says current activity to plant mangroves on Mexican beaches and on the Arabian Peninsula along the Red Sea could harm nearby reefs and destroy fisheries. Spalding claims the added nutrient outflow from mangrove forests would upset the delicate balance of the coral reefs that are "extremely sensitive to nutrient pollution."

The plan to plant the mangroves was developed by retired cell biologist Gordon Sato. He already has 250,000 trees growing on the shores of the Red Sea in Eritrea. His plan is to create vast new mangrove forests that will provide fodder for goats and help combat global warming. He estimates he can plant some 50 million mangroves in the Red Sea area and perhaps 200 million on the Baja and mainland shores of the Sea of Cortez.

The mangroves are planted on the beaches between the high and low water marks and up to a ton of fertilizer per acre is added in small bags buried near the new trees. The bags will slowly release needed nutrients for the trees. Sato claims there are many other areas of the world that would benefit from his plan.

In Memoriam

Al Bridell **Rosalie Taylor**



Tropical Snails at the London Zoo

By
Tom Eichhorst

The Invertebrate Conservation Centre of the London Zoo houses thousands of live mollusks for study, propagation, and species preservation. One of the families housed at the zoo is Partulidae (superfamily Partuloidea). According to Abbott (1989), this is "a large group of small snails isolated on small high islands from the Marianas and Palaus (sic) to the Society and Marquesas Islands of Polynesia." Abbott goes on to say that most species in the family are arboreal, living under large leaves in trees and large plants. There are about 117 species in a single genus, *Partula*, with 12 subgenera. Most species are small (20 – 25 mm) and all are ovoviviparous. That is, the young develop in eggs that either hatch immediately after being laid or are held within the body cavity of the female until hatching and then are "born" alive. While very similar to live birth, this still involves an egg and thus the "ovo" or egg prefix to the more common term viviparous (bearing live young). The shells lack the vivid coloring found in many of the other tropical land snail species, with mostly browns and yellows and occasional banding on a gracefully shaped shell with a tall spire and a reflected lip (Fig. 1).

Fig. 1. *Partula radiolata* (Pfeiffer, 1846). This small (22 mm) land snail is typical of the *Partula* species the London Zoo is attempting to maintain.

But this is not meant as a descriptive piece on this family of small, seemingly mundane snails. This is really the story of why the London Zoo has over 2,000 specimens of *Partula* and why they and other institutions have expended such an effort to maintain and raise various *Partula* species. The scientists in London are raising *Partula* species thousands of miles away from their normal locality in a last ditch effort to save an endangered genus, one that has already lost many unique species to extinction. The loss is certainly a case of lost species diversity, but it also involves losing species similar to Darwin's finches on the Galapagos. These snails have evolved into numerous specialized species and are of interest to scientists because of their adaptive radiation on these small mountainous islands. This is also the story of the often-disastrous effects of alien species introduced by man into delicate environments. The culprit here is man, but the agent of extinction is actually another mollusk.

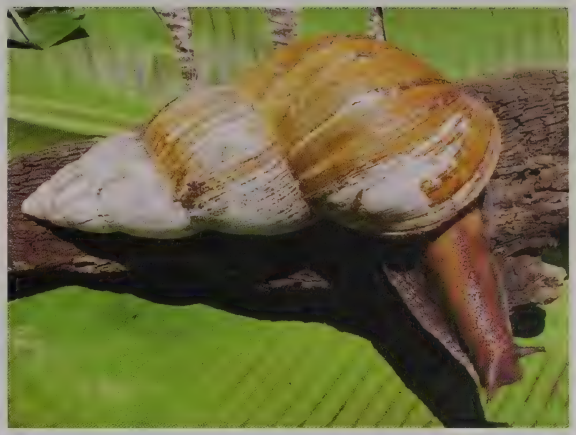


Fig. 2. *Achatina fulica* Bowdich, 1822, the giant African snail. This specimen is 100 mm (shell) length, an average size. It was photographed at the Honolulu Zoo. Photo courtesy of the Honolulu Zoo, Honolulu, Hawaii: http://www.honoluluzoo.org/african_land_snail.htm

This story starts with *Achatina fulica* (Bowdich, 1822), the giant African snail (Fig. 2, 3, & 4). No, this herbivorous giant did not kill off the *Partula* species, but it provided the first push down their slippery slope to extinction. *A. fulica* is a marvel of evolutionary development. This extremely large snail can weigh over a kilogram, grows 6 to 8 inches in shell length (can fully extend to over 12 inches), matures at 8 months, lives for up to 9 years, and once mature a single individual will lay from 100 to 400 eggs every few weeks. The members of the genus *Achatina* are hermaphroditic, with both male and female sexual organs in each individual. A single mating can result in a number of egg clutches from both individuals without subsequent contact. This infamous species prefers decaying vegetation but will eat pretty much anything green and has the potential to devastate commercial food and ornamental crops.

A. fulica is in the family Achatinidae which has 13 genera, all indigenous to Africa. The genus *Achatina* has some 75 species, all large herbivores (Figs. 2,3,4, & 7). In Africa these snails are eaten by many local populations, but for whatever reason they have not become a diet addition in other countries. Most people in India, Indonesia, China, and the Pacific islands where this snail now occurs see it only as a pest and not a culinary item. In Great Britain the various species of *Achatina* are considered popular pets! A web search will turn up a number of sites on the captive care of giant African snails.

Originally from Africa, *A. fulica* spread far from its ancestral home with the aid of its accomplice, man. It has been introduced throughout the Pacific and as with most such cases,

Fig. 3. *Achatina fulica* with the periostracum removed, 92 mm, Philippines.

the story of the spread of *A. fulica* is one of misguided good intentions. The French governor of the island of Madagascar is credited with first bringing the snail out of Africa and releasing it in the gardens of his residence in 1812 as a potential source of medicine for his ailing wife. It soon spread well beyond the governor's gardens and became established on the island. Once *A. fulica* left the African continent it began an inexorable march (crawl?) eastward towards the Pacific. In 1847 a traveling Englishman brought the snails from Mauritius to Calcutta, India. He had originally intended to bring them home to Britain but instead released them in the Calcutta Botanical Gardens. By 1900 the snail was in Sri Lanka and by 1928 it was established in Singapore and Indonesia.

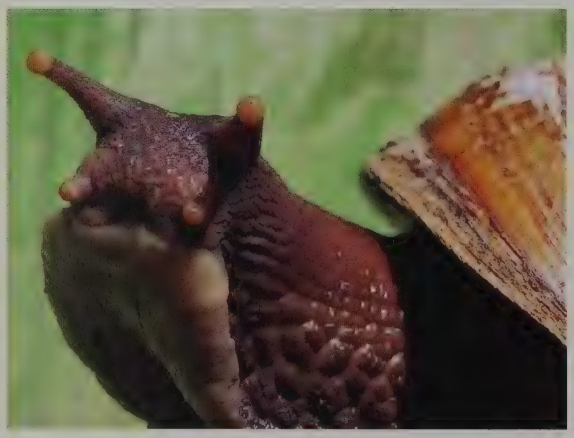


Fig. 4. The business end of *Achatina fulica.* Photo courtesy of the Honolulu Zoo, Honolulu, Hawaii: http://www.honoluluzoo.org/african_land_snail.htm

In 1936 a woman brought two of the snails from Taiwan to her home in Oahu, Hawaii. She released the snails in her garden and the combination of bountiful vegetation, no natural enemies, and a prodigious reproductive capacity resulted in the spread of the snail throughout the island and eventually to neighboring islands. In November of the same year, a resident of Makawao, Maui, had some of the snails mailed to him from Japan. They also eventually escaped and by the time authorities became aware of the problem in 1938, it was too late to contain the snails.

During World War II the snail was spread throughout the Pacific by the Japanese and seemed to thrive on each island where it was introduced. It was not long before the reports of serious crop damage had authorities concerned enough to try to halt the advance of this pest. Twice it almost became established in the continental U.S. Once just after World War II (the specimens were found on returning military vehicles and destroyed) and again in 1966. A young boy vacationing in Hawaii smuggled in three giant African snails when he returned home to Miami, Florida. Reportedly his grandmother eventually released them into her garden. Seven years later, 18,000 specimens were destroyed at a cost of hundreds of thousands of dollars. In 1977 a colony was discovered in Gordonvale in north Queensland and successfully eradicated after a similar expensive operation. The species is now established from Africa, India, and Sri Lanka to Japan, China, the Philippines, Papua New Guinea, Samoa, Tahiti, Vanuatu, New Caledonia, and Hawaii. But what about Polynesia where our story of the endangered *Partula* began?

In the 1960s, the giant Africa snail was introduced to Polynesia as a farmed food item. Whether or not it caught on as table fare, it predictably escaped and was soon ravaging local crops. And now we get closer to the cause of extinction of the local *Partula* species.

Fig. 5. *Euglandina rosea* (Férussac, 1821). A voracious predator of other snails, originally from the southeastern U.S. This specimen is a 50 mm adult and lacks the shiny red coloring of the juveniles that is responsible for the name "rosea." The shell is very thin and delicate.

Fig. 6. *Euglandina rosea*, 65 mm, on tree stump, Florida. Photo by Bill Frank, from Jacksonville Shell Club web page: http://www.jaxshells.org

When local farmers complained about crop destruction caused by the giant African snail, authorities came up with the oft-repeated and ill-conceived plan of releasing a snail predator to control the *Achatina*. A similar plan was tried in Hawaii in attempts to control the giant African snails. Authorities there released predatory snail species. The snails were from the family Streptaxidae. Species of *Gonaxis* and *Euglandina*, both voracious snail predators were released in the hopes they would control the *Achatina*. Of course, what actually happened was that the predatory snails turned on the much smaller and easier to subdue local endemic snails (Achatinellidae) and the giant *Achatina* continued to flourish. The once abundant *Achatinella* of Hawaii are now endangered with many species believed extinct. This is probably due in large part to habitat destruction, but certainly the introduced predators did not help. But Polynesian authorities were not dissuaded.

In 1978, *Euglandina rosea* (Férussac, 1821) (Figs. 5 & 6) was released on the Polynesian Islands to seek out and kill the giant African snails. *E. rosea*, from the southeastern U.S., is a voracious predator of other snails. But like the experience in Hawaii, the *Euglandina* were less interested in the giant African snails than they were in the much smaller endemic population of *Partula* snails. They fed on *Partula* snails and within ten years many species were extinct and most were endangered. At least 27 species are thought to have become extinct and many more are critically endangered. Authorities from the London Zoo captured specimens of the few remaining species and began a breeding program back in Britain. Of course, captivity in London was not an easy matter and some of the species were eventually down to a handful of specimens. In 1994, on the island of Moorea, keepers from the London Zoo along with an international team, constructed a fenced-in area of 20 square meters protected by a salt water moat and an electric fence to the keep out the *Euglandina* predators and allow reintroduced *Partula* snails to breed. One of the species reintroduced was down to four individuals; now that species numbers in the thousands. Organizations participating in captive propagation of *Partula* include the John G. Shedd Aquarium in Chicago, the Detroit Zoological Park, the London Zoological Society, and the Jersey Zoo.

Of course, the released *Partula* will probably never be actually re-established in Polynesia until the *Euglandina* are eliminated. As found with the *Achatina*, this is no easy matter. Perhaps there is another snail predator out there that can be introduced to the islands?

Fig. 7. *Achatina reticulata* Pfeiffer, 1845. Another of the large African snails. This specimen is 163 mm and was collected on the island of Zanzibar.

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My Life With a Giant Clam

By Jordan Star
Murex1Man@cs.com

It all started with a desire to own a *Tridacna gigas* (Linnaeus, 1758). After a bit of persuasion, my father finally agreed to have a giant clam grace our home. We knew that Pier 1, an import store with many outlets, was a potential source of my giant bivalve. The store imports exotic items from around the world. I knew they carried shells and kept a watch out for a giant clam. At the time I bought many large and small shells from Pier 1, but the locality data was sketchy at best. But I was a young inexperienced collector and this was not a concern at that time. One day a LARGE crate from the Philippines came with a giant clam inside, and the adventure begins.

The year was 1970 and my father owned a Jaguar XKE, a two seater with a side-opening hatchback. I say this because the clam was taken home in this car. We first saw the clam in the store parking lot in its crate. The clam was three feet six inches (0.91 m, 15.24 cm), approx. 60 lb. (27 kg) and the crate was rough-hewn mahogany. The man was paid $100 and in the morning we came back to the store to claim our prize. We uncrated the clam for the journey home as the crate was much too big for the car. The wood from the crate was saved for later use in the workshop. A workman from the store helped us put the clam in the car and away we went.

The ride home was quick and uneventful. The car was much lower to the ground than normal because of the weight of the clam and the hatchback was open to the side, a bit of a road hazard for other vehicles. Most, but not all, of the clam was in the car with the shell hinge facing down. The end of the clam stuck out about one foot with towels flapping in the wind to protect the car and clam. You can only imagine the sight we presented as we went down the road.

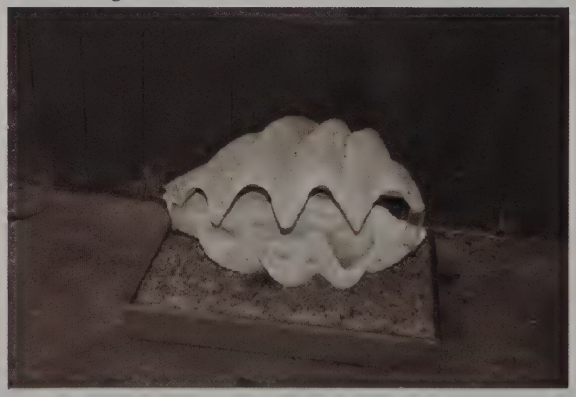
When we got home we had to shuffle cars around. With the driveway clear we backed in and prepared to unload my prize; destined for the patio in the back yard. A table was pulled up to the back of the car to help in the removal of the clam. The wood was put in the garage for later use. With the clam on the table, we then proceeded to move our prize to its final resting place. My father and I could lift the clam and take four or five steps before putting it down so we could rest. It was not only heavy, but quite awkward to carry. With the clam temporarily settled on the patio, I was tasked with coming up with a proper display setting. A few days later I came up with an idea. The clam would sit on a "bed" of gravel with a wooden frame around the stone to keep it from getting scattered about. I built a frame about 4 feet x 3 feet (1.21 m x 0.91 m) by 6 inches (15 cm) high. The frame had only two cross members along the largest dimension on the bottom, so the frame could not be lifted when the stones and the clam were in place without leaving the stones in a pile. Then the problem of sourcing the stone (no pun intended) was contemplated.

In my travels around Long Island, I had seen a large pile of blue stone at a road construction depot. My Mom and I loaded three buckets into the station wagon and headed to the construction depot. With the three buckets filled we preceded home and poured the stone into the homemade frame. Smoothed out, the "bed" was now ready for the clam. Both halves were put on the stone to display it as in the accompanying photograph. The clam was "closed" so a means had to be devised to "open" it. I made two wooden supports for the sides to hold the clam open and that was that, until... One of my father's friends would come over from time to time who happened to work for the Nassau County Museum complex. One day he said that the supports I made were unpleasant to the eye and he could make a better support. When he visited again he had two clear Plexiglas supports, an admittedly nice improvement.

In the late 1970s I agreed to loan the shell for a shell display at the Garvies Point Museum in Glen Cove, NY. While the shell was on display, a little girl, the daughter of the local newspaper photographer, was photographed standing in the giant clam. Now with the clam away from home, I was able to clean the stones in the display stand. After the exhibition ran its course, the clam came home.

All good things come to an end. When I moved, the clam couldn't come with me. It was much too large for my place. I sold the giant shell to a shell club member who put it, of all places, in his living room!

It is interesting to note that there was a large "drill" site near the hinge. It was round, the size of a golf ball, and about half way through the shell. Some animal was "drilling" through the shell for a meal. And what a meal that would have been! Even though the shell was kept outside, the rain and snow did not seem to harm it. I periodically cleaned out the leaves and debris from the interior of the shell. I was sad to see the giant clam leave and someday I'll get a small one so I can remember the days of my "life with a giant clam."



My giant clam on the gravel bed I built to display the shell. The two halves are held apart with specially cut Plexiglas supports.

Come to Tampa Bay in 2004 for Sun, Fun, and Shells

Tampa Bay Hyatt

The shell clubs of Pinellas County, Florida cordially invite you to join us for *Sun, Fun, and Shells* at the 2004 convention in Tampa, June 26-July 2, 2004 at the Grand Hyatt Tampa Bay.

A variety of accommodations are available at the Hyatt. Standard hotel rooms with 2 double beds or a king-size bed are $95 per night for up to 4 people. Suites are available in 3 sizes for $250-350. Apart from the hotel there are condo-like casitas that are $315-395. The spacious ballroom at the Hyatt has 10,370 square feet for the bourse, welcome party, verbal auction, programs, and banquet. Restaurants on the premises include Petey Brown's, Armani's, and the Oystercatcher. Additional information about the Hyatt may be obtained by visiting the web site at www.grandtampabay.hyatt.com.

Early registration will be Friday June 25. Three pre-convention field trips are planned for June 26: a trip to historic Tarpon Springs including a sponge boat cruise and shopping; a dive trip on the *Plunger* from Clearwater Beach; and a fossil collecting trip at the Caloosa shell pit. Additional field trips during the convention include a choice of an evening intertidal marine collecting trip or a dinner cruise and a morning trip to the Florida Aquarium or the Florida Botanical Gardens.

The Grand Hyatt is located at the northeastern end of Tampa Bay minutes from Tampa International Airport, just off Interstate 275 at the airport exit. Complimentary shuttle service is available from the airport to the Hyatt.

For further information about the 2004 convention, keep watching in the *American Conchologist* or contact the convention chairperson, Betty Lipe at (727) 391-2197 or rlipe1@tampabay.rr.com, or the publicity chairperson, Alice Monroe at (727) 796-5115 or monroea@spcollege.edu.

Speakers Needed

The 2004 COA Convention Committee invites you to present a program at the *Sun, Fun, and Shells* Convention, June 26-July 2 at the Grand Hyatt Hotel in Florida's Tampa Bay Area.

If you would like to give a program, contact Carolyn Petrikin, 2550 Sweetgum Way West, Clearwater, FL 33761. Phone: (727) 796-4117. E-mail: CEShell@aol.com

Henry McCullagh receives Clench Award

by Harry G. Lee

COA member W. Henry McCullagh, Jr., of Orange Park, Florida, was awarded the William J Clench Award at the Annual Meeting of the Freshwater Mollusk Conservation Society on 26 March 2003 in Raleigh, North Carolina. The award is given in recognition of a "non-professional malacologist" who has made a significant contribution to the field of freshwater malacology and conservation of freshwater mollusks.

Henry is a sixth generation Floridian and was raised as an outdoorsman. He spent most of his childhood and adult life in Jacksonville, Florida. His college education was at Emory University, where in family tradition, he studied medicine, finishing first in his class in 1964.

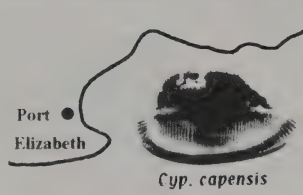
Although involved in angling, ornithology, and marine malacology at an early age, his interest in naiads began in 1974 with the collection and study of the fauna of northeast Florida. As the flame grew brighter, his fieldwork carried him west from the St. Johns to embrace most of the major river systems in the eastern U. S., including the Atlantic slope systems as far as Maine, the Holston-Clinch-Powell and several other tributaries of the Tennessesee River, the Tippecanoe of Indiana, the Eau Claire of Wisconsin, Upper Darby Creek in Ohio, and the Arkansas River, to name just a few.

Despite his amateur status, Henry drew on his scientific education, keen wit, and naturalist's instincts to compile a working chronicle of his fieldwork. His collections have been prodigious but careful, and his field observations fill eight bound journals. His counsel and shared material have been acknowledged by his many collaborators including Bob Butler, Tom Watters and Jim Williams.

Perhaps impelled by a special affinity for the genus *Quadrula*, Henry's greatest energies have been directed at the naiad fauna of the Mobile River system. His travels in Alabama, usually in the company of his wife, Lenore, who happens to be a nationally-recognized ornithologist and conservationist, have fostered a very special insight into this still prolific but sadly depleted pearly mussel fauna. Using a variety of watercraft they plied the Coosa, Tallapoosa, Cahaba, Black Warrior, Tombigbee, and Alabama. Among his many sentinel discoveries was a living population of *Potamilus inflatus* (I. Lea, 1831), thought extinct.

His paper (with junior collaborators) on the Sipsey River fauna was published as the lead article in a recent issue of the *American Malacological Bulletin*. This study pulled together the classic work of Herbert H. Smith with that of Henry and others over nearly a century of Alabama history - a fitting legacy by two true naturalists born of the Southern tradition.

Dr. Tom Watters of Ohio State University and emeritus COA Convention program chairman (Louisville, 1999) was inducted as the Society's president at the same meeting.



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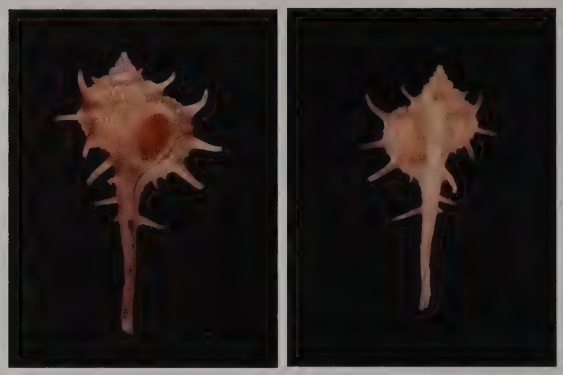
SEP02

Caribbean Muricidae

by Kevan & Linda Sunderland and Maurizio Riccio

Specimens illustrated from the collection of Kevan and Linda Sunderland, 9370 NW 39th Street, Sunrice, FL 33351 email: KLShells@mindspring.com.

1. *Haustellum bellegladeense* (E.H. Vokes, 1963), 52 mm, dredged from 270 feet of water off Egmont Key, Florida.



2. *Haustellum lindajoyceae* Petuch, 1987, 29 mm, dredged in 325 feet of water off Sombrero Reef Light, Marathon, Florida.

3. *Haustellum bellum* (Reeve, 1845), 80 mm, taken in lobster trap set in 70 feet of water on offshore bank between Jamaica and Honduras.

4. *Haustellum blakeanum* (E. H. Vokes, 1967), 37 mm, taken by fisherman from 40-60 meters of water off Cabo La Veza, Colombia.

5. *Haustellum samui* Petuch, 1987, 91 mm, dredged in 130 feet of water off Porto Bello, Caribbean Panama.

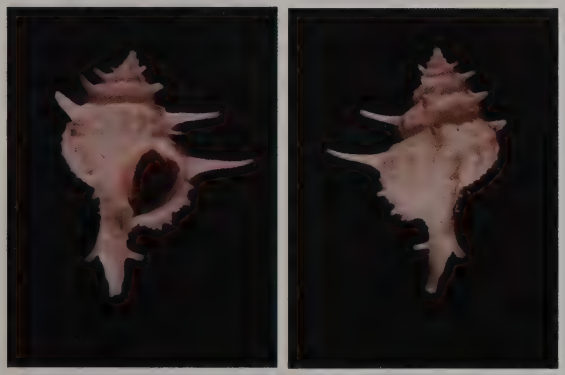
6. *Haustellum sallasi* (Rehder & Abbott, 1951), 44 mm, taken by commercial shrimper from 200 feet of water in the Gulf of Campeche, off Contoy Light, Mexico.

7. *Siratus articulatus* Reeve, 1845, 56 mm, taken in trap set in 120 meters of water off Puerto Cortes, Honduras.

8. *Siratus hennequini* Houart, 2000 (PARATYPE), 59 mm, taken in trap set in 220-230 meters of water off Mangrove Bight, Roatan, Honduras.

9. *Siratus bessei* Houart, 2000 (PARATYPE), 61 mm, taken in trap set in 170-200 meters of water off Pulpit Rock, Roatan, Honduras.

10. *Siratus caudacurta* Houart, 1999, 46 mm, dredged in 170 fathoms of water off Corpus Christi, Texas.



11. *Siratus colellai* Houart, 1999, 40 mm, dredged in 230 fathoms of water off Alegre Camaquay Province, Cuba.

12. *Siratus guionneti* Merle, Garrigues & Pointier, 2001, 54 mm, dredged in 200 meters of water off Southern Marie Galante Island, Guadeloupe.

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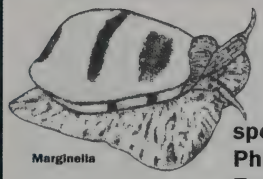
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The Neptunea Award was established in order to recognize outstanding and distinguished service to conchologists and malacologists. This award is given to up to 3 awardees for:

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   OR
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Name of nominee: _____

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The charm of South African Shells – A short excursion along the Southern Cape

By
Zvi Orlin
(The Desert Gazelle)
E-mail: zviorlin@actcom.co.il

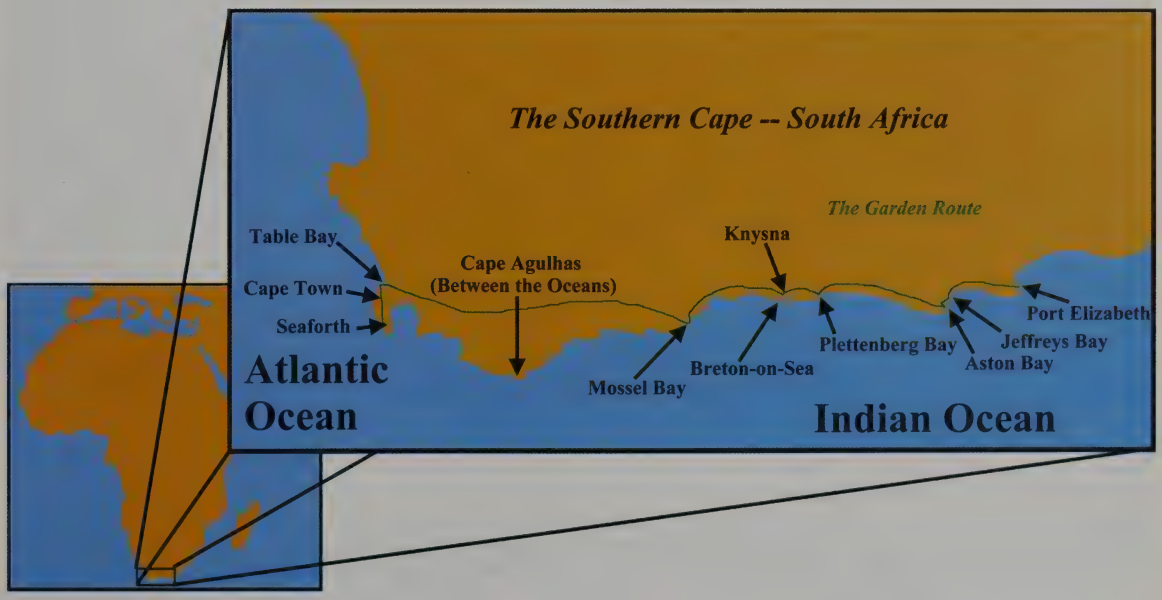
For me, the charm of South Africa extends well beyond its many colorful seashells. This is the country of my education and youth, filled with pleasant memories of colorful scenery (veldt, mountains, deserts, a sub-tropical coast and the charming Cape Province) and a unique flora and fauna. It also has an intermingling of tribes and later European settlers, with the resulting inequalities and internecine altercations that can be found in other regions of the African continent. But during my last visit 11 years ago, I was regrettably not yet an amateur conchologist. So it was with great expectation and excitement that I set out once more to visit my aging brother and to spend a week searching the South African shores for shells.

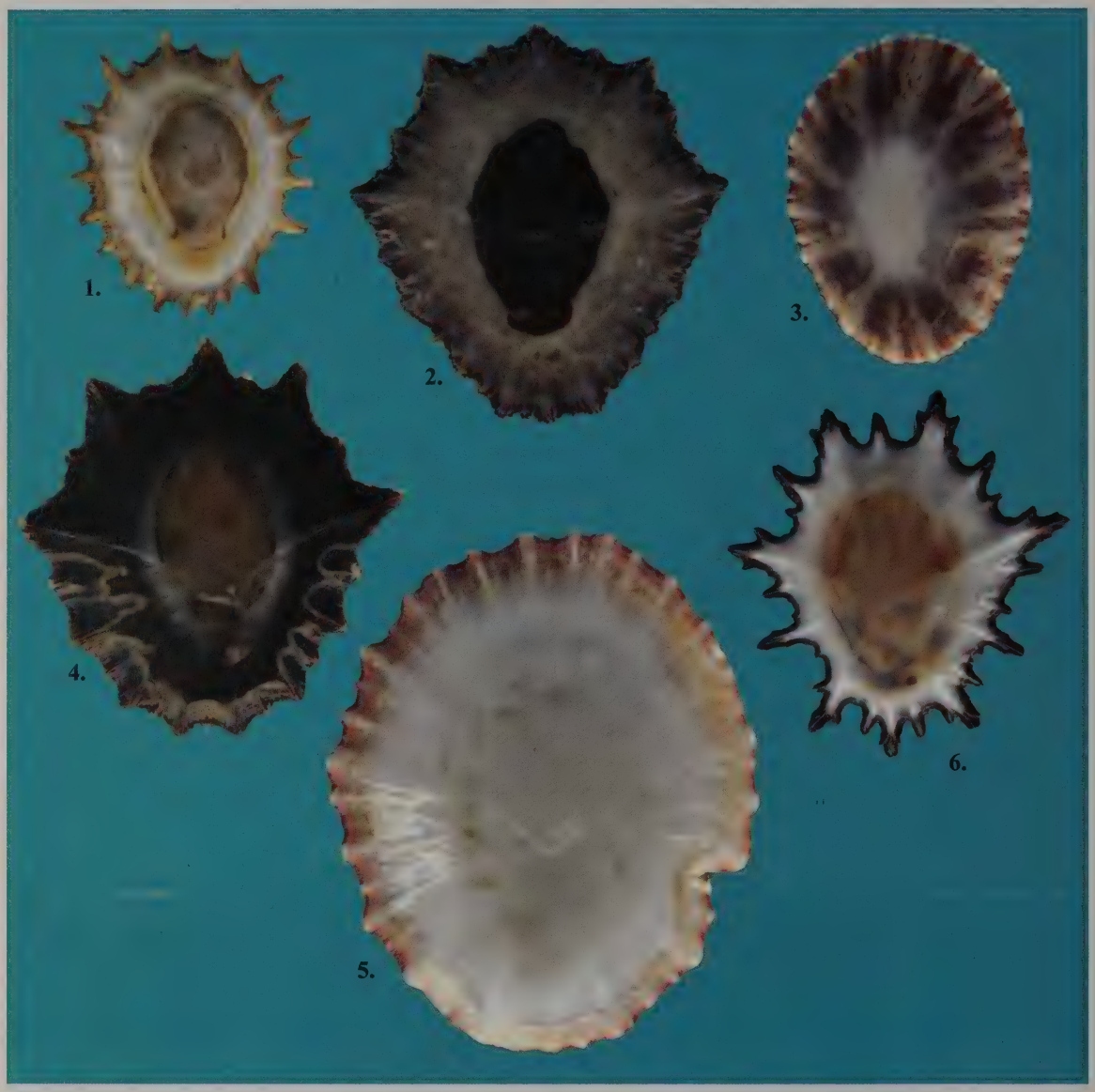
The great attraction of South Africa for shellers is, of course, its numerous endemic species. This area is the site of a collision of two ocean currents: the warm Mozambique-Agulhas current from equatorial waters in the Indian Ocean, and the cold Benguela current from the Atlantic Ocean, surging north from the floating ice of Antarctica, with its upwelling and nutrient rich flow. This meeting place of the two oceans at South Africa results in a wealth of endemic species of marine mollusks. In a recent article in the "South African Journal of Science," M.J.Gibbons and a group of scientists estimated that as many as 52% of the species found in the area are endemic (Gibbons et al., 1999). Few countries in the world can compete with this level. This article reports there were 3,062 species found on South Africa's shores. A full list has not yet been published and the list is continuously being supplemented by additional new finds. Hopefully the list will be published in the near future.

My first call on the trip was to Professor Douw Steyn in Pretoria, who together with Markus Lussi, published a well-illustrated book on marine shells of South Africa. This excellent book described over 1000 species, most beach collected. He and his wife Elise have a fine collection and were most generous in providing me with very fine specimens in exchange for shells I brought with me. Worthy of note is that over 220 species from the Red Sea region are also found in South Africa on the Indian Ocean side and are dealt with in their book. He also gave me the addresses of some renowned amateur conchologists in Cape Town and suggested some of the most likely beaches to search for shells.

Cape Town was next on the itinerary and there I met David Freeman, one of the leading figures among shell collectors on the Cape and a very friendly and generous individual. He took me to visit Victor Millard, whose book "Classification of Mollusca" is an updated version of Kay Vaught's famous older version, which was my 'Bible' for many years. Both David and Victor presented me with some local shells and gave me good advice on which beaches would prove most prolific. Regrettably David passed away shortly after my visit. Victor gave me the address of his friend Arie Jooste of Aston Bay, of whom I will write more later.

I concentrated on five main regions: the first was Sea Point in Cape Town on Table Bay, where I collected 36 species. Of special note from this location were six species of *Patella* with





Some of the giant *Patella* species found in South Africa. 1. *Patella barbara* Linnaeus, 1758, 56 mm. 2. *Patella granatina* Linnaeus, 1758, 79 mm. 3. *Patella miniata* Born, 1778, 65 mm. 4. *Patella oculus* Born, 1778, 79 mm. 5. *Patella tabularis* Krauss, 1848, 104mm. 6. *Patella longicosta* Lamarck, 1819, 71mm.

unusual colors and forms. Over 20 *Patella* species are found in South Africa and many of them are endemic. Additional finds were a few Trochidae of the genus *Diloma*, subgenus *Oxystele*; common along the cape. The subgenus *Oxystele* has recently been upgraded to genus level, but some experts still regard it as a subgenus. Three species of *Diloma* are also found in New Zealand, but not in Australia. I also collected some fine, large specimens of Mytilidae: *Choromytilus meridionalis* and *Aulacomya ater*, mainly found in the southern and western Cape. A subspecies of *Aulacomya* is found in New Zealand, but not in Australia. One wonders if this is purely coincidental? Perhaps we should not be surprised. Remember that during the Ordivician Period, in the Gondwana supercontinent, both areas were near the Equator and the distance between the southern tips of present Africa and New

Some of the more popular South African shells; 1. *Cypraea* (*Cypraeovula*) *edentula* Gray, 1825, 28 mm; 2. *Cypraea* (*Cypraeovula*) *fuscodentata* Gray, 1825, 34 mm; 3. *Cypraea* (*Cypraeovula*) *fuscorubra* Shaw, 1909, 32 mm; 4. *Cypraea* (*Cypraeovula*) *capensis gonubiensis* Massier, 1991 Gray, 1825, 32 mm; 5. *Cypraea* (*Cypraeovula*) *mikeharti* Lorenz, 1985, 22 mm; 6. *Turbo sarmaticus* Linnaeus, 1758, 76 mm (including a polished specimen); 7. *Melampium lineatum* (Lamarck, 1822), 25 mm; 8. *Conus natalis gilchristi* G.B. Sowerby III, 1903, 29 mm; 9. *Conus parvatus* Walls, 1079, 16 mm; 10. *Conus pictus* Reeve, 1843, 27 mm; 11. *Conus tinianus* Hwass, 1792, 29 mm; 12. *Conus typhon* Kilburn, 1975, 30 mm; 13. *Columbarium radiali* (Watson, 1882), 45 mm.

Zealand were much closer than currently. A relatively short distance of open-ocean separated them, while Australia was much further away. This may have contributed to the appearance of similar species or genera in New Zealand and South Africa.

The second location I searched was Seaforth, further south on the Cape Peninsula, where I found my first *Bullia* species. These large unusual Nassaridae, common in South Africa, are mainly found along the southeast and east coasts. This was where I also found my first *Marginella*, *Marginella rosea*, an endemic species of the southwest cape. South Africa is famous for its *Marginellas*, almost all of which are endemic. They seem to be popular with collectors and some are very highly priced. At Seaforth I also found my first cone, *Conus algoensis*, another endemic. I then visited a nearby beach called Boulders, where a thriving penguin colony is in residence. They were quite tame and let me close to within touching distance without them batting an eye. It was one of the highlights of the trip! Fantastic! Both of these locations are on the eastern side of the peninsula with warmer sea temperatures in contrast to Sea Point on the colder west coast.

Then a short detour to the famous Kirstenbosch Gardens at the foot of Table Mountain, which houses most of the endemic species of the Cape flora. During a brief stroll along one of many paths, I met up with a mongoose family frolicking among the bushes. They seemed oblivious to our presence and provided a gala performance.

I then set out on a four-day journey along the Garden Route, renowned among tourists who visit South Africa for its scenic views. It is situated on the Indian Ocean side of the continent. It was February, mid-summer, with ideal dry weather. This area enjoys a Mediterranean climate with winter rains. From Cape Town I took an easterly route, via Sir Lowries Pass in the Hottentot-Holland mountains, to Mossel Bay. This is the beginning of the Garden Route, heading east along the coast through George. Just before Knysna, was the first stop at Breton-on-Sea. The cliff top afforded a splendid view of the Knysna Lagoon. At the crack of dawn I hiked down to the sandy rock-strewn beach and competing with the local oystercatchers (*Haematopus moquini*), found only 14 species of mollusks. They were mainly bivalves, among them some large specimens of the endemic *Donax serra*, *Perna perna* (also found in the Red Sea), the uncommon *Saccostrea forskahlii*, and *Limaria inflata* (locally referred to as *Limaria tuberculata*, a junior synonym). This is a nest building species also found on our Mediterranean shores.

The next stop was Plettenberg Bay. Here a relation of mine had spent many summer vacations and had accumulated an extensive collection of beached shells. She is an artist and is enamored with the beauty of the shells, all found locally. She offered me the choice of any of her specimens, so I acquired over 30 species, half of which were new to my collection. I would have needed a much more extended stay in order to find these on my own. While drinking coffee one morning on her porch overlooking the sea, we were entertained by a large pod of dolphins, a hundred or more, diving into the waves just offshore from east to west and back again. It was as though they were putting on a special repeat performance for our entertainment and joy, an unbelievable sight! The only place I have seen a larger pod was once in the Galapagos Islands where the sea all around our boat was covered by uncountable hundreds of dolphins. We joined them in the water to get a closer look and to experience their underwater antics. Back in Plettenberg Bay I couldn't leave without a short hike in the famous Tsitsikama Forest and a boat trip through the Storms River Canyon. This is one of the most beautiful sites in South Africa. As you travel along the river you are dwarfed by the giant trees and cliffs. Trees here reach a height of over 30 meters and some are reputed to be 1000 years old. As an added benefit there are any number of rare birds that can be spotted in this forest. This is the heart of the "all year rainfall" region of Southern Africa.

On to Jeffreys Bay, my last and most important destination. I planned to spend a few days here as it is renowned as one of the most prolific beaches for shells in South Africa and has a worldwide reputation. More than 400 species of mollusks have been collected in Jeffreys Bay, a veritable shell collector's paradise. As we were not there in the right season (winter is recommended), I did not expect to find many shells. I managed to collect 40 species, some of which I had already collected in other locations. Of special interest were many endemic species. I found nice specimens of: *Turbo sarmaticus*, *Turbo cidaris*, *Calyptraea helicoidea*, *Burnupena cincta*, *Burnupena pubescens*, *Bullia tenuis*, *Trigonostoma foveolata*, *Conus natalis*, *Glycymeris connollyi*, *Ostrea algoensis*, *Ostrea atherstonei*, and two large specimens of South Africa's largest chiton, *Dinoplax gigas*. I later established contact with a local shell collector who has been scouring the beaches for many years. We exchanged shells and I received from him another 50 species from Jeffreys Bay. I also visited the local shell museum, which has an impressive display of Jeffreys Bay and other South African shells.

But the biggest bonus of all was meeting Arie Jooste, with his fascinating collection of shells of the region. He and his son Philip have found some of the rarest shells and Arie even has some species named after him. He was very friendly and generous and gave me many specimens for my collection.

We concluded our trip in Port Elizabeth, and as we were flying back north I mentally summed up my South African trip. I set out on this trip with only a few dozen South African shells in my collection and was returning with a wealth of additional species. After a few later exchanges I reached 700 new species to my collection, including shells from other locations also found in South Africa. I concluded that my short southern sojourn had taken me to one of the finest corners of the globe. I not only added to my shell collection but I met any number of charming people and experienced some truly dramatic scenery. I strongly recommend South Africa for a perfect shelling adventure.

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Helmet Headaches

By

Jim Miller

Of all the shells I have ever cleaned (and trust me, I have stunk up many homes, hotel rooms and condos cleaning various marine mollusks), nothing seems to give me more problems than helmets. In the past a weird hazing would show up on the parietal shields, dark streaks with no apparent cause and even strange bubble-like circles that seemed to form under the surface of the shield. What gives?

Oddly enough, back in the late 1960s and early 1970s, I collected at least a half dozen huge *Cassis madagascariensis* in sand pockets between the spur and groove reef formations off Key Largo and never had a problem cleaning them. The animals always came right out after either boiling or freezing, and the shields were always pristine, despite the fact I paid little attention to them during the cleaning process.

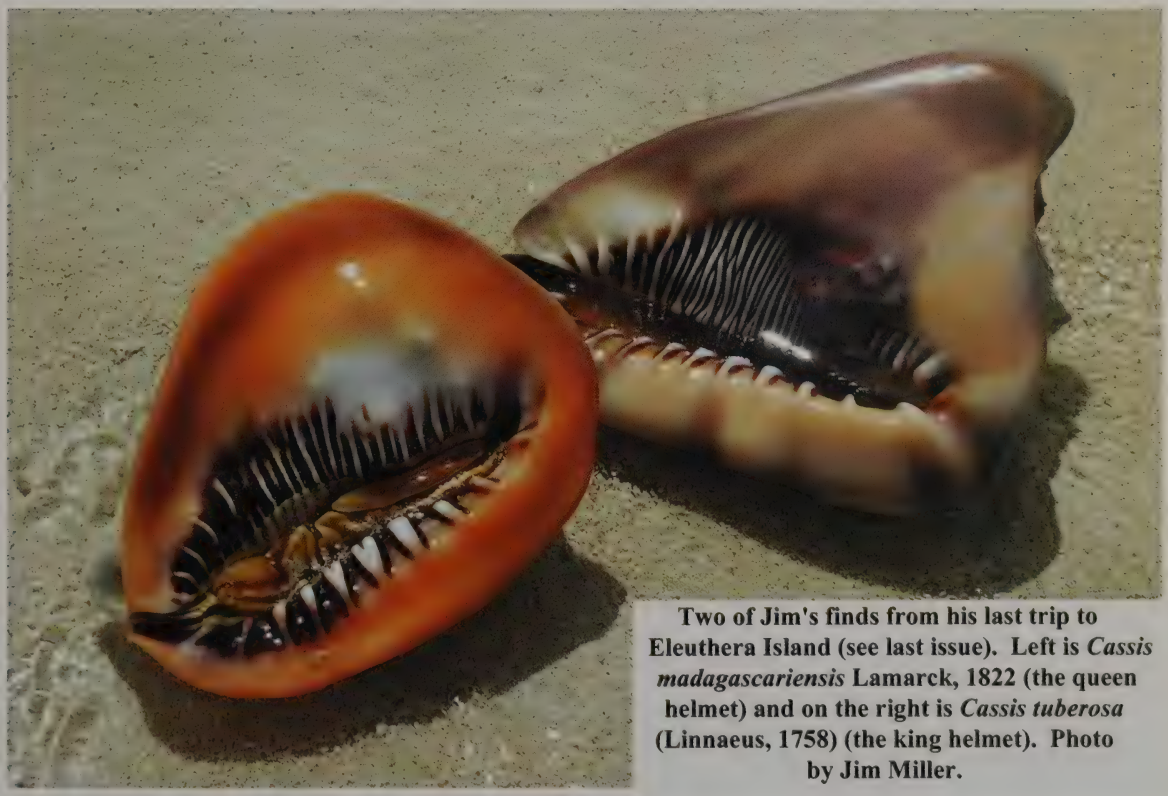
But when I found my first few *Cassis* species (*C. tuberosa* and *C. madagascariensis*) in the summer of 1999, I started having a tough time keeping the shields from getting spots, streaks or cloudy areas, not to mention having one heck of a time getting the last little bit of the animal out. Several specimens have that distinct "leftover animal" odor to this day.

Fast forward to the 21st Century. I now liberally slather the shields of any *Cassis* with Vaseline as soon as humanly possible after finding them. I continue to keep a coat of Vaseline on the shield throughout the cleaning process and still I occasionally have some minor flaws show up, although they are now so small as to be unnoticeable to the average person. Still, I know they're there.

My biggest problem remains getting that last little bit of the animal out. If allowed to remain in the shell, the decomposing flesh will actually create a dull, cloudy area on an otherwise perfect helmet. I had to resort to the old tried and true toothpaste and a stiff toothbrush to bring the gloss back to two specimens I picked up on this trip. I also know that despite my best efforts, the deep, rich orange of my nicest *C. madagascariensis* will eventually fade away to a softer peach color typically associated with this species. Thankfully, I took plenty of photos of my best specimen while it was just minutes out of the water.

Oddly, some people never experience this hazing and streaking problem. Then again, I never did in the "old days." My advice is to always be proactive. Keep a thick layer of Vaseline on your helmets until they are completely clean. Never boil them (this hastens the fading). Freezing works well, as does placing them in a tree or bush for two days, after which much of the animal will be hanging down about a foot or more. Be careful if you have them in a sunny place as the animal will actually dry out and the operculum may drop to the ground, so place an old towel or newspapers under the helmet to catch the 'perc if it should fall.

Good luck.



Two of Jim's finds from his last trip to Eleuthera Island (see last issue). Left is *Cassis madagascariensis* Lamarck, 1822 (the queen helmet) and on the right is *Cassis tuberosa* (Linnaeus, 1758) (the king helmet). Photo by Jim Miller.

TANNED, RESTED AND READY IN THE ABACOS
By Mike Schenk

I moved back to land-locked Colorado a year ago after spending two "brutal" years working as a boat captain and scuba instructor in Maui, Hawaii. Needless to say, I was ready to get back in the water to do some diving and shelling. Jim Miller, Paul Kanner, Scott Schubbe and I eagerly planned a trip to Eleuthera in early May of this year. I had three extra days off from work before we were to meet on Eleuthera, so I decided to

take off early and fly to the island of Great Abaco in the Bahamas. I thought it would be fun and relaxing to rent my own boat and try to dive and shell as many islands as I could before flying over to Eleuthera to meet "the team."

After arriving in Marsh Harbor, I picked up an 18 foot whaler, loaded up my dive gear and sped off towards Man-O-War Caye. My plan was to grab a navigation chart and some water and ice to go with my pre-packed meals (military MRE's) and shove off on a northwest heading, shelling every island in the region. Jim Miller had recommended shelling around Guana Caye and some of the other nearby islands. I couldn't have asked for better locations to shell.

My daily plan was to be in the water by sunrise and give each area at least 30 to 60 minutes before pulling anchor and heading off to somewhere new. The shelling was fabulous at almost each of the 25 islands I visited. The channels around Whale Caye were loaded with *Cassis tuberosa* with a specimen sighted every hundred feet or so. I spent a lot of time holding my breath underwater trying to pick the best ones. These channels were also frequented by a large pod of spotted dolphins that enjoyed surfing off the bow of my boat. *Fasciolaria tulipa* (all sizes and colors), *Xenophora conchyliophora*, *Strombus costatus*, *Strombus raininus*, *Cyphoma gibbosum*, *Cyphoma mcgintyi*, and a nice *Charonia variegata* were all found in these areas. I found over 130 different species in only three days!

I would finish shelling around sunset and anchor the boat offshore during the evenings to avoid as many mosquitoes as possible. Trying to sleep on an 18' boat in the wind was quite the

adventure! I'm not sure if it was the waves slapping the hull, the rocking boat, the mosquitoes biting through multiple layers of insect repellant, the inch of water I was laying in, or my mind thinking about where to shell next that kept me awake all night. Needless to say, after three days without sleep and eating MRE's, I was ready for a bed and a "real" meal.

On my last day, I went out on a chartered scuba trip to dive the barrier reef off Guana Caye. I was surprised to see how different the species were just on the other side of Guana. Not to mention some huge tarpon back in the caves. After the scuba dive, I returned to Great Abaco for a nice night in a hotel. The next morning, after bribing the baggage attendant to let me get on the plane with my overweight bags, I was off to Eleuthera where the adventure was to really begin.

So if you're into living on a small boat, swimming and shelling from sunup to sundown, let me know. I would do it again in a heartbeat. Aloha!!!!!

The images that accompany this article are actually of Eleuthera and were taken by Jim Miller for the article in the last issue. But they serve as perfect illustraions for Mike's Abacos adventure. Of course he "would do it again!" -- Ed.

A Day at Gamagori Fantasy

By Dan Yoshimoto
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In May of 2002, my wife, Hiromi, and I discovered what was to become one of the largest dilemmas of our shell collecting years. No, it wasn't an unusual, unidentifiable species of mollusk, but something even more perplexing.

While in Japan visiting friends and Hiromi's relatives, we were invited to spend a few days in Nagoya, central Japan, with some lovely Japanese people who had visited us here in California, several years earlier. While in Nagoya (with pneumonia) I was told of a place that had to be visited before leaving. Now, being with pneumonia (like being with child) I really wasn't anxious to go out scrounging around for new places of interest. But, when told that they were planning on taking us to Gamagori Fantasy, in Takeshima, I quickly threw down a few more medications, put on my sweat suit and agreed to the excursion.

Like you at this point, I had to ask, "What in the name of Buddha is Gamagori Fantasy?" "Is it a movie?" "No," responded our hosts, "you'll have to wait and see." They, knowing that Hiromi and I were serious amateur shell collectors, wanted to surprise us with "their adventure."

Takeshima is about an hour south of Nagoya by train and 1 1/2 hours by car. It is located at the edge of Atsumi Bay, an area known for tourists and Shinto priests. An odd, but not unpleasant combination.

After an hour and a half riding in a car, in heat that was almost unbearable, we reached Gamagori, a suburb of Takeshima. Now to find Gamagori Fantasy! Restaurants, Shrines, Temples, "Oh, there it is... the place with all the shells covering the entrance." Large letters "GAMAGORI FANTASY".

After paying the entrance fee, we entered into a world that can only be described as B-I-Z-A-R-R-E. If you've ever been to Disneyland's "A Small World," then you can imagine what was there. No, there were no floating boats, but the singing displays were equally strange to behold. There were walk-through displays of various legends and myths, all completely created with shells from all over the world. There is a tunnel that is wall to wall, floor to ceiling, solidly covered with *Strombus gigas* Linnaeus, 1758. No, they didn't leave out the floors. Pathways of large thick glass panels covered floor displays. All in all, it is estimated that the entire display area has over 50 million shells, some of them not so common. After the "fantasy displays," there was a large collection room with exhibit cases of common to rare, plain and beautiful, specimen shells from around the world.

Now, you ask, "What was the dilemma?" Have you ever been torn between beautiful exhibits and the thoughts on ecology? To a culture that reveres nature and natural beauty, the display was incredibly wonderful, but what has happened to the environment because of the animals that were taken from the planet in such numbers. 50,000,000 shells are quite a number of sacrifices!

Returning to Nagoya with our friends gave me time to ponder what I really thought of Gamagori Fantasy. I still have not solved my dilemma. Like the piles of empty *Strombus gigas* shells on Caribbean Islands or the huge piles of shells alongside fishing villages, it simply is another aspect of the man – mollusk interaction. Hopefully the following photographs will convey something of this dilema.

This page: above, entrance display; below, Hiromi Yoshimoto in shell and urchin tunnel with glass floor.
Following page (p. 27), clockwise from top: large pedistal display with base of *Cypraea tigris*; bright floral display with dyed *Strombus canarium*, sea dragon made of shells; and a portion of a wall of shells.

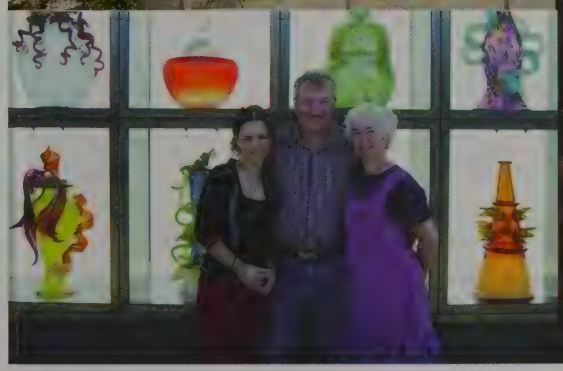
COA Tacoma Convention: A Big Success

The 2003 COA convention in Tacoma, Washington was, by any measure, a huge success. With almost 250 registered participants, this was the largest COA convention on the west coast. Most folks had to travel quite a distance, but it was worth every mile. From the well-organized and quick registration, to truly superb hotel accommodations, to informative and often intriguing programs, to what could only be called a breathtaking setting; this convention had it all. Tacoma is a marvelous city, clean and full of numerous attractions. Tom Rice and the Pacific Northwest Shell Club outdid themselves. Attendees were from many states as well as the countries of Japan, China, Vietnam, Indonesia, the Philippines, Thailand, Australia, Guam, Brazil, Bermuda, Canada, England, Scotland, Ireland, Austria, Belgium, Germany, Switzerland, Spain, Italy, Portugal, South Africa, and Mozambique!

To those of us who have traveled to the Seattle/Tacoma area before, perhaps the biggest surprise was waking up each day of the convention with an unrestricted view of Mt. Rainier. This magnificent mountain is normally well hidden behind clouds, but it was a welcome sight throughout the convention. We had beautiful weather, met great old and new friends, and enjoyed a closing banquet that featured a speaker (Barry Wilson, author of the two volume *Australian Marine Shells*) who gave an interesting and beautifully illustrated talk on the endemic Australian Cypraeidae, the genus or subgenus *Zoila*. But just as important, he supplied the banquet with red and white wine from his own vineyards. The bottles featured a *Murex pecten* and most were carried off as souvenirs once empty.

This year's Bourse was, as we have come to expect, an extravagant display of common to very rare shells. I bought a shell for 10¢ (for those who think only expensive shells would be displayed). I also saw a group of about six *Cypraea* on one table that were collectively worth more than my 1999 Ford Taurus. But as usual there were plenty of bargains and I was able to pick up quite a few shells I "needed." A friend of mine attended for the first time this year and she remarked afterwards that the Bourse was overwhelming. She said she had "never seen anything like this and it made the trip worth every cent!" So to all who are reading this and have not attended a convention recently or maybe have never attended, you really owe it to yourself to make plans for the 2004 COA convention at the Grand Hyatt in Tampa Bay, Florida. The following images from the convention are courtesy of Dave and Lucille Green.

Clockwise from top left: Tom Rice's Of Sea & Shore Museum, Port Gamble; Art Weil, Wayne & Patty Humbird at the Bourse; a past president's conference with Linda Brunner, Betty & Bob Lipe; the Coker clan - Stephanie, Steven & Wanda at the Tacoma Glass Museum.



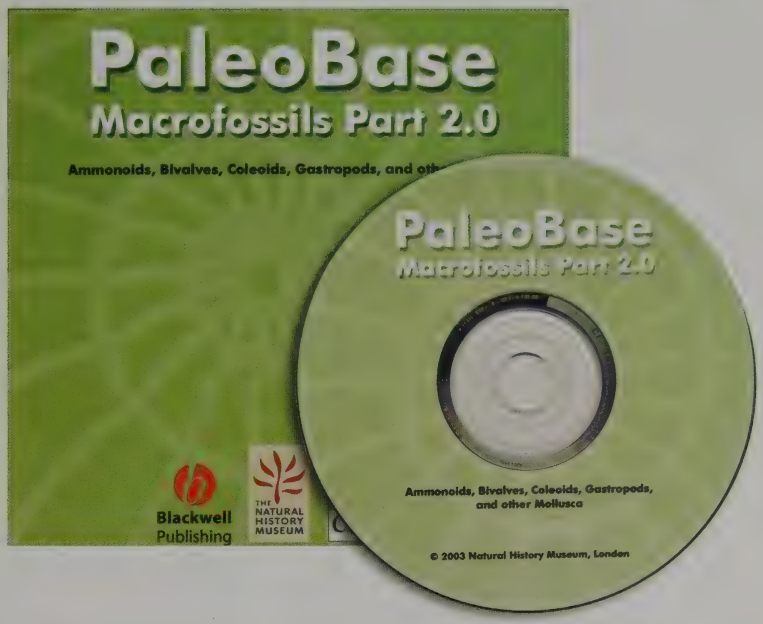
Top row left to right: Bill Lyons, Anne Joffee, & Jack Lightbourn enjoy a libation at the banquet; Tom Rice in a pensive moment - perhaps he has just sighted the light at the end of the tunnel; Dr. Hank Chaney (COA Vice President) looking for a bargain.

Right: Lucy Clampit has her wallet at the ready.

Below, top row, left: COA President Tom Grace presents the COA Neptunea Award to Jim & Linda Brunner; right: Tom Grace presents the COA Neptunea Award to Doris Underwood - both well deserved awards to people who devote considerable time and energy to our organization. Bottom row left: Sue Hobbs with several tables of shells and an ever present smile; right: the always gracious Mary Ruth Foglino and her smiling date Hank Foglino.

Review of Paleobase 2.0 An Interactive Database

by Tom Eichhorst



Paleobase 2.0 is a little gem from the folks at the Natural History Museum of London. The editor is Dr. Norman MacLeod. He and his team of about a dozen specialists have compiled an impressive database of macrofossils presented on CDs. Part 2, reviewed here, covers mollusks, including: ammonoids, bellerophonts, bivalves, coleoids, gastropods, hyoliths, monoplacophorans, nautiloids, polyplacophorans, rostroconchs, and scaphopods. Part 1.0 covers arthropods and Part 3.0 is echinoderms and sponges.

The *Paleobase* CD has excellent searchable and sort features that include: ecological habitat, biogeographic realm, chronostratigraphic range, author (for genus records and bibliographic reference), year of publication, key references, keyword, morphological character, shell mineralogy, and combinations of these parameters. *PaleoBase* also features the customizing ability to store lists as separate files and read these lists back into the database when they are needed.

Easily used, it is a simple matter of loading the disk and then clicking on the desired button. Selecting "groups" provides a list of 318 fossil genera. You can then scroll down to whatever genus you are interested in, for example *Neptunea*. Clicking on *Neptunea* brings up a page with images of the type species (high resolution of 600 dpi with several views presented), the key reference for the genus, systematics from subclass to family, a timeline (in this case 23 million years from the Neogene to Recent, biogeography (Northern Hemisphere), and ecology (marine). Each entry has a records section with many more details such as, a description of the shell morphology of the genus, the mineral makeup of the shell, classification, stratigraphical range, and key references.

This is certainly not a complete listing for fossil mollusks, but for the 318 genera listed it is an excellent guide. Just having the list of genera with full citation of author and date has proven invaluable. There is also a last feature that I found myself referring to quite often. The CD includes a searchable morphological glossary divided into separate sections for each key group. Thus there is a glossary for gastropod morphology with 104 terms, one for bivalves with 72 terms, scaphopods with only 5 terms, etc. The definitions are concise and there are over 200 terms defined.

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American CONCHOLOGIST

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CONCHOLOGISTS OF AMERICA, INC.

Volume 31, No. 4 December 2003

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, as well as advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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President's Message

December 2003

It's really hard to believe that another year has come and gone so quickly. As we go into the holiday season I am grateful for having had the opportunity to enjoy being a part of this wonderful organization and getting to know so many of the membership. It is a time we can remember those members who are no longer with us, to all of our loss, and remember all the new members we have gained, to all of our benefit.

All in all I think we can look back on 2003 as a very, very good year for COA. All of the many publications and the many shell shows that occurred during the year have shown that not only has the world of conchology and malocology remained a vibrant pastime, it is one which continues to grow. Our shining star this year as a club event was the wonderful convention Tom Rice and all of his Northwestern associates pulled together for us in July.

Items of business at the 2003 convention included the election of officers for 2004 (officers from 2003 were re-elected) and raising dues to cover increased mailing and production costs. See the note on page 3 from our Membership Director, Doris Underwood for details.

Plans are well underway for the next two years of COA conventions with Betty Lipe and her crew from the Tampa/Clearwater/St. Petersburg region sponsoring 2004 in Tampa. And Anne Joffe, with her crew, is already set for pulling together the 2005 conference in Sanibel. Both localities offer superb accommodations for the actual convention as well as a plethora of activities and sights. Ladies, we are looking forward to both conventions. I am sure any donations to support the verbal and silent auctions would be appreciated by both groups. Also, it's not too late for other clubs to be thinking of 2006 and 2007! Anyone interested let either Hank Chaney or myself know!

As we get ready to close out the year, on behalf of the COA Board of Directors and myself, we want to wish you and your family our best wishes for a most enjoyable holiday season and a happy, healthy and prosperous New Year.

Tom Grace - President

Change in Membership Dues

Doris Underwood, COA Membership Director

At the annual COA meeting in Tacoma WA., the COA membership dues and postal charges were amended effective 1 January 2004. Our last increase in dues was in 1997 and since that time the production costs of American Conchologist have risen and postal charges have increased significantly.

Membership dues effective 1 January 2004 - $25

Dues plus postal charges (magazine delivery) are:

USA bulk Rate - $25 (no additional)
USA First Class - $25 + $5 postage = $30
Canada/Mexico - $25 + $5 postage = $30
All other countries - $25 + $15 postage = $40

Membership renewal notices will be mailed in late fall. Those members who have prepaid will not receive a notice.

Please check the address label on your magazine envelope. The year dues are paid is listed and is followed by the class of US Mail selected. Questions concerning membership should be directed to Doris Underwood, COA Membership Director.

Front Cover: Various colors and patterns of *Conus generalis* Linnaeus, 1767. This widespread Indo-Pacific cone that is always a favorite with collectors is one of the cones David Herman was able to collect in Fiji (see story page 30).

Back Cover: *Cymatium parthenopeum keenae* Beu, 1970. Photogrphed by Charlotte Lloyd off San Lucas, Baja, Mexico. This wonderful live shot is a preview of a Baja collecting trip by Jim Miller, his wife Margo Blake, and Charlotte. The story of the trip and photos will be in the March 2004 issue and will include more live shots plus a rather unusual purple *Spondylus princeps* Broderip, 1833.

In Memoriam

Evelyn Bensch
Carlo Cavalieri
Kevin Lamprell
Luigi Raybaudi
Horatio Buck
Paul Fischer
Bert Porreca

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FIELD MUSEUM LIBRARY

Like Father - Like Son. The two walking the mud with a Sanibel Stoop are Tom Grace (COA President) and his son Todd. It looks from here like Todd has done a bit better than Dad.

MOLAS, MOOLAH and MOONLIGHT: A Shelling Expedition to the San Blas Islands, Panama

This article is dedicated to the memory of Pat Bingham, master sheller, shelling mentor, and friend. Her knowledge and appreciation of shells illuminated and enlightened us. She is greatly missed.

Karen Vander Ven

The sun glinted on the sand patch about six feet below me on an off-shore reef and highlighted a little reddish something just lying there. I dove down, grabbed it, surfaced, and opened my hand. It was unmistakable. In my hand was a beautiful *Conus granulatus,* the famous Glory of the Atlantic cone that lives in deep water under coral and rubble. I hadn't really believed it when I heard the species might be found in the shallows. This shell was just one of many marvelous finds during a week of collecting off the San Blas Islands in Panama, located northeast of Panama City on the Caribbean side. The trip, organized and led by Glenn Duffy, offered both extraordinary shells and a unique opportunity for a special cultural experience. Aside from shells there would be the opportunity to view and perhaps purchase some molas, the beautiful and colorful hand appliquéd needlework made by the native Cuna Indians who inhabit and run the islands.

Any shell trip is undertaken with a sense of adventure, of being on a quest. The quest of this trip was mutually shared and apparent to all; we wanted to find *Conus* (*Leporiconus*) *glenni* (Petuch, the beautiful pink-orange cone named for our trip leader. Thus the theme of this trip was *Conus glenni.* Would we find any? What else would we bring home? Even though we had high expectations, we didn't dream that a "once in ten years' find" as Glenn put it, and a world-record size shell, would be taken. The following account describes the trip and what we found.

Glenn Duffy, organizer and leader of the San Blas Islands shelling group.

The goal of this quest, *Conus glenni* Petuch, 1993. A shallow water species originally described from East of Moro Tupo, San Blas Islands, Panama.

Making Weights

After a year of planning and anticipation the time had finally come. Joining trip leader Glenn Duffy would be June Bailey, Bet Hamilton, Pat Bingham, Dick Bingham, Ron Bender, Ken Piech, Alice Piech, Marilyn Barkley, Linda Zylman, Dave Holzinger, Trevor Roberts, Shary Almasi, Phil Fallon, Ildze Ejups, Ann Rhode, Homer Rhode, Laurie Dunfee, Bill Kreis, and me. To prepare for this trip there was a major challenge - to keep our luggage weight to 25 pounds to meet the stipulations of the small aircraft that would fly us from Panama City to San Blas. A maximum of 25 pounds when I need at least a 10-pound weight belt to avoid floating like the proverbial cork? I easily put my resort wear away and settled for a few sets of faded shorts and t-shirts, but even then I was sure my pack came in overweight. Adding to it was some heavy reading matter, such as James Michener's lengthy *Caribbean* selected as an appropriate book for the occasion.

Arriving in Panama City the afternoon before our flight to San Blas, some of us took advantage of an opportunity to visit the Panama Canal and see a huge tanker pulled through the Mira Flores Locks. Early the next day we headed to the small airport from which we would fly to the islands. There was some spirited discussion with airplane personnel about the collective weight of our luggage and to help settle it we gave up our bottled water, piling it up on one of the plastic chairs.

Eventually we all landed on Porvenir, an island adjacent to our destination, Wichub Wala. Within seconds our belongings were loaded into long hollow vessels powered by outboards, and we were on our way across the water to Wichub Wala. As the boats rounded the front of the island I saw basketball hoops

mounted in the dirt and several young boys playing. I knew I was going to love it. Next to shelling my favorite activity is basketball.

Our first shelling area was an island called Coledup. Before I could finally get down to business, however, I had to set up my weight system. I took quart-size freezer strength baggies, filled them with sand, and stuffed one in each pocket of two weight belts. Another weight-deprived fellow sheller had suggested this idea, and it worked amazingly well. Soon I was finding shells among rock-studded grass-and-sand patches, with the highlights for the day being a large and perfect *Mitra barbadensis* and a bright yellow jewel box, *Chama macerophylla.* Bet Hamilton found a *Haustellum messorius* and several people were overheard saying they hoped to find one before the trip was over. There were also *Muricopsis oxytata, Strombus raninus, Cypraea zebra,* and many other species. To cap off my day, Glenn slipped me a pair of scallops. A bit of scraping later showed them to be another prize of the area: bright red *Caribachlamys imbricata.*

The author playing basketball (in a dive outfit) with the local Cuna Indian boys.

Going for a Cone

Next day we shelled a reef offshore of another island, Achutupo Chico. I was soon delighted with a pair of *Risomurex deformi,* with their distinctive black-and-orange striping. Then I set to work searching for *Conus glenni* among the lettuce coral. Aptly named, the light brown coral looked like heads of lettuce that had seen better days. Here and there it was punctuated with beds of green algae. Just as I drifted over a patch of sand in search of another coral formation I saw the *Conus granulatus.* A mere distraction from the matter at hand of finding a *Conus glenni*! Glenn had advised us all to go slow, look very carefully, and look for contrast in color and shape. Persistence and patience would out, he emphasized. As I rolled up on shore at the end of the day, I found an interesting and unidentifiable *Calliostoma* species in the sand, along with a *Tellina radiata.* No *C. glenni* for the day, but with the *C. granulatus*, I could hardly complain.

A prize on any expedition, the brillantly colored *Caribachlamys imbricata* (Gmelin, 1791). Above is the exterior view of the shell and below is the interior.

Next day we were off to a new area, Nidirpitupa. As we pulled up to shore we couldn't miss the Cunas awaiting us with a colorful display of molas and tritons (*Charonia variegata*) for sale. We finally figured that the reason that we weren't finding them ourselves is that the natives realized their attractiveness to tourists and collected them first. Even so, Bet, June, and Dick went home with beautiful tritons this day.

We finally dragged ourselves out for lunch and for some midday "shell and tell." Homer wanted to show us something. Suspense mounted. What could it be? He emptied one of his signature blue-and-white collecting bags. There was a large, perfect wentletrap (*Epitonium),* alive! Twenty jaws stopped chewing on their fried chicken as they dropped open in awe. What an incredible shell! Homer said he had found it far offshore by digging deep in the sand - a Herculean effort that obviously paid off. At the time we weren't sure which *Epitonium* species it was.

The wentletrap wasn't all! Linda, who we all know has a way of finding extraordinary cones, came through

A dark elegantly colored *Cypraecassis testiculus* (Linnaeus, 1758). An abundant shell on this trip.

as well with a cone with light brown splotches. Preliminary identification suggested it might be *Conus granarius*, or perhaps *Conus pseudoaurantius*. Fine *Cypraecassis testiculus* abounded here, along with *Prunum guttatum, Prunum carneum, Cypraea cinerea, Fasciolaria tulipa, Muricopsis oxytata, Mitra dermestina,* and *Tritonoharpa lanceolata*. Bivalves included *Pecten imbricata, Pecten ornata, Pecten antillarum, and Leporimetis intastriata.*

Next day at an island called Kacantupo Yerba Isle, there was a varied habitat that held more finds. One spot enabled us to wade on shore and turn rocks. Here Shary found incredible "micros" and later it was interesting to see these tiny creatures crawling around in their little jars. June found a huge *Astraea caelata,* and an *Arene cruentata*. There were also *Tellina radiata, Conus regius, Cypraea zebra, Cypraea cinerea, Cassis flammea, Vasum muricatum, Engina turbinella,* and *Coralliophila caribaea.*

Glenn then took us to a wonderful reef area just a fast boat ride across the waters from Wichub Wala. We could actually see the waves breaking over the reef line. This was Olnagandupo. There was a great deal of varied territory here: grass, sand flats, and acres of lettuce coral. I opted for the coral. Soon I found a lovely little colony of fresh *Columbella mercatoria,* one of my favorite shells and selected several brown and black ones. Then I took a *Latirus cuna*, named for the island inhabitants. I was still searching for the elusive cone, looking in every crevice of lettuce coral and on the top of the algae patches. And at last, there it was, a small, but perfect *Conus glenni*. The human Glenn came by and I happily showed my find to him. Yes, persistence and concentration paid off, just as he had said. Before we returned to the boats, I found another small one. I was at peace.

On our last day, we went back to Coledup. Several of us had *Haustellum messorius* on our agendas. There were a few grungy *Charonia variegata* tucked away in bottom crevices, and they're probably still there. I picked up a nice *Strombus raninus*, while Bet, lucky again, came in with another *Haustellum messorius*. Gathering back at the boats, Dave had the prize this time, a huge orangey red-banded cone that looked like a *Conus glenni* - but again we weren't sure.

In the Misty Moonlight

The die-hard shellers on this trip were up, literally, for shelling day and night. Because of the fact that shells come out to feed at night only when it is really dark, we postponed leaving for our trips until 11:00 PM. We'd sit on the porch, praying that a thunderstorm didn't keep us off the water, trying to stay awake and then finally wiggling into our gear, cold and damp from the day's use. The first night we went just around the corner from Wichub Wala. The top item on everyone's wish list was, of course, *Conus glenni*. So like everyone else, I set my light to carefully spot red cone shapes highlighted against the brown lettuce coral and green algae as I drifted in the light chop. "There!" I thought triumphantly as I saw a round red object that was the apex of a *C. glenni* for sure. I picked it up only to find a bright red *Tegula fasciata*. This frustrating scenario was played out over and over again and I had to console myself with several of the pretty little

A rare sight in shallow waters, the glory-of-the-Atlantic cone, *Conus granulatus* Linnaeus, 1758. A worthy prize!

Bet Hamilton, sporting a traditional Cuna face painting, poses in front of serveral colorful molas.

tegulas and *Volvarina avena.* These last were easy to spot in little crevices but hard to bag due to their small size and slipperiness. It turned out Dave had hit the jackpot, finding four *C. glenni.*

A night return to Achutupo Chico was in order. It was thrilling to ride across the waters and it's amazing how different an area looks at night in comparison to daylight. A nearby island was an inky dark shadow. The wavelets seemed bigger than they really were. Moonlight tinted the fluffy clouds scudding by overhead. In I went, and as long as I could see the winking spots of light marking the location of the other shellers, I felt reasonably relaxed. Peering down into one of the lettuce coral heads, I immediately recognized and retrieved a *Calliostoma javanicum.* Having found that shell, there wasn't too much more I could want (except for another *C. glenni* perhaps). I felt very good about the evening as did the other shellers, several of whom were successful in their *C. glenni* quest.

On our final night trip, we zipped right over to Olnagandupo for what turned out to be an interesting and productive night on the reef. To start off, Bet found a wonderful dwarf *Strombus raninus.* Soon I found two large *Bursa granarius cubaniana..* Then there were Mr. and Mrs. *Marginella* (*Prunum*) *oblongum* out for an evening stroll in a patch of sand.

Oliva reticularis ernesti Petuch, 1990, considered one of the many morphs of *O. fulgurator* (Röding, 1798) by some authors.

Down in a cluster of lettuce coral, easy to see but hard to reach, I saw a large *Conus glenni*! Its cone shape and bright orange color were almost luminescent and struck a pang of excitement in me. One wrong move and it would be history, drifting down into the depths of the coral structure. There was a huge dilemma: how to grasp the reef to steady myself, hold my light, *and* reach for the shell. Unfortunately I needed three hands, had only two, and opted to let go. I reached and.... dislodged the shell which turned over and over as it sank out of sight; the one that got away. I straightened up, reminded myself of the wonderful shells I *had* found, and plunged back in. I was somewhat consoled by several nicely marked *Oliva reticularis ernesti,* another endemic subspecies, picked up just before I tumbled back in the boat.

Getting back into the dugouts when there was no dock had been an entertaining challenge for us throughout the trip. Dave devised the most elegant boat re-entry. He gallantly sat on the bottom kneeling on one knee so that one could put a foot on his thigh and be handed on up and in.

By the way, after I returned home and cleaned my shells, I received a consolation prize for my lost live *Conus glenni*, a cone-shaped encrusted thing I had picked up and kept. After removal of the thick covering it turned out to be an orange-pink *Conus glenni,* the largest of those I found. It was not in the best of condition, but it still supported that old sheller's adage "If it's shell shaped - take it!"

"One Dollah, Please."

We had been told if we wanted to photograph the natives they would expect to be paid a dollar, and to bring lots of "moolah" in the form of one-dollar bills. Indeed we all sported thick wads and they came in handy. One morning I saw two youngsters bouncing a red, white, and blue basketball. Perfect photograph, I thought. I followed them down the alley where they stopped and turned around, grinning for the camera and posing like pros. Suddenly their mother appeared from behind a hedge. "That will be one dollah please!" she exclaimed, and of course I forked over one of my handy bills.

The beautiful molas were a temptation and most of us bought some. Across from the hotel, business was booming for one mola artisan, who took orders on commission to create and execute a shell theme. We'd go up to her requesting "*caracoles*," and by the end of the trip our molas were ready. Even though the molas featured intricate handwork, we were tickled to see a woman running an old Singer sewing machine in one of the huts - in order to stitch the backings for the handwork. To add to our interaction with the native culture, Bet had her face painted in a distinctive black striped native adornment.

To Helado and Back

Somehow we always seemed to be hungry, even though Bet kidded us and said, "You can live off your hump!" Finally there came time when the fresh fruit with every meal just wasn't going to meet the needs of the group's collective sweet tooth. As the weather warmed we began to crave ice cream (*helado* in Spanish) and I became as determined to find us some ice cream as I had been to find a *Conus glenni.* At the last little grocery store

The mystery ep that turns out to be *Epitonium* (*Hyaloscala*) *worsfoldi* Robertson, 1994. A shallow water species known from the Bahamas, Puerto Rico, and Cuba.

Another of the mystery shells, *Conus juliandreae* Cargile, 1995. While not as sought after as *Conus granulatus*, still an uncommon cone. Most specimens offered in the trade seem to come from Honduran waters.

of several on the island, after I had been told "no helado," there was a spirited exchange between the proprietress and a boy. Pointing to him she exclaimed, "Take you helado. Follow." So I followed him around back pathways until he finally stopped in front of a narrow thatched doorway. A couple came to the door, and after another exchange brought out some cups and bars of ice cream! Soon we were all there, handing over our "dollahs" and licking the ice cream like children at a summer fair.

While our thatched accommodations were austere, we found ourselves quite comfortable throughout the trip. Orlando, our host at the Hotel Kuna Niskua, did everything he could to make us feel at home and to facilitate our shelling activities. There was no electrical outlet with which to use my little pot that has served me well on so many shell trips. This provides hot water for early morning coffee using a coffee bag and a shell boiling pot at night. People are sometimes stunned at how this pot serves double duty. But what could be cleaner to drink from than a pot that boiled shells fresh from the ocean? The coffee problem was solved by the restaurant staff who arranged to put out a thermos of hot water almost as early as I got up, and the shell boiling problem was solved by the pleasant restaurant staff who, with a connection made by Glenn, and with a smile, would take your shell before dinner and return it to you after dinner, complete with operculum.

We had no trouble keeping busy when we weren't out shelling. We admired each other's unique shelling outfits, with Ron taking the prize for his sharp black and white chef's style pants. We'd show our shells to each other, contributing to the list of finds being compiled by Phil Fallon (accompanying this article) and trying to ID them.

Everyone knew I had been trying to assemble a tulip exhibit. So over the course of the trip, each day, a fellow sheller would press a lovely tulip into my hand, saying, " Here's an extra one I found." As a result of their generosity, laying them out once home, I have an impressive size and color spectrum. Some of these tulips have the markings of *Fasciolaria tulipa hollisteri,* the subspecies found in the lower Caribbean and traditionally brought home from Margarita Island in Venezuela.

In the morning, children dressed in navy and white school uniforms and toting American style backpacks, streamed by on their way to the island school. Those not in school would drape themselves over the porch railing, watching us and gazing at the shells we'd be showing each other. Now and then throughout the trip, just as we boarded or exited the boats, I'd go out to shoot a few baskets with the youngsters who easily integrated me into their game and seemed not in the least perturbed that their teammate was a white haired woman whose uniform was a wet suit and booties.

Evenings included various kinds of festivities, including a birthday celebration for Lynn Barkley complete with a fine cake commissioned from the kitchen staff by Glenn. Half of our group lived in a downstairs suite of rooms and the other half upstairs in a building across the pathway. The "upstairs" group would periodically host a party and we'd all enjoy a bit of rum and snacks along with our shelling stories. We spent lots of time sitting in the dark passing the time of day and not surprisingly I only got through about one chapter of Michener's *Caribbean.*

We were all sobered and worried towards the end of the trip when our fellow sheller Pat Bingham became seriously ill

Astralium phoebium (Röding, 1798). A common Caribbean shell with an interesting sculpture. Most are not quite as colorful as this specimen.

and was evacuated from Wichub Wala to Panama City and on to Florida for intensive medical care. Subsequent to our trip home we were profoundly saddened to hear Pat passed away due to a severe bacterial infection.

Show Your Identification

We were not to have an accurate identification of Homer's wentletrap (originally thought to be *Epitonium novangliae*), or Dave and Linda's cones, until the trip was over. Subsequently, Homer showed his shell to Harry Lee and Emilio Garcia, who identified it as *Epitonium worsfoldi* Robertson, 1994. Cone expert Bill Cargile identified Linda's cone as *Conus julieandreae* and confirmed that Dave's cone was not only a *Conus glenni,* but is also a size that exceeds the current world record! Numerically, our finds toted up to over one hundred or so species (see Species List compiled by Phil Fallon).

All shell photos by Jim Miller; "people" photos by the author.

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Jordan Star's Web Picks

☺ = poor, ☺☺ = fair, ☺☺☺ = good, ☺☺☺☺ = excellent, ☺☺☺☺☺ = outstanding

☺☺☺☺☺ Peter's Seashells http://members.shaw.ca/bcshells/shellcore.html. A well-constructed site, lots of solid pictures and info. A special section on shells of the NW Coast of North America. Many, many links. Fast display of any page.

☺☺☺☺ Bailey-Matthews Shell Museum - http://www.shellmuseum.org. Good selection of categories, lots on the museum, local shells, shells as money, shells in art, etc. Of particular note are two downloadable PDF files (gastropods & bivalves) by the museum director Jose Leal 2002, in K. E. Carpenter (ed.) The Living Marine Resources of the Western Central Atlantic. Lots of information.

☺☺☺☺☺ Ohio State University, Digitgal Murex - http://www.biosci.ohio-state.edu/~molluscs/murex28/ Outstanding! Fast loading pages, lots of info, and good pictures. Takes a month or so to fully check out. Of course it's a glowing review, what's my email? Check out all of the biological links.

☺☺☺☺ GastroClass: Gastropod Classification - http://www.nhm.ac.uk/palaeontology/i&p/gastroclass/gastroclass.htm. Too technical for this reviewer, but taxonomists go crazy! No pictures, excellent list of links & references. Developed by the Natural History Museum of London.

☺☺☺☺ Worldwide Conchology - http://www.worldwideconchology.com/. Strangely behaving site: multimedia, links, music, some script errors, click yes to continue. Much info. Stay with it! Interesting pictures, lots of variety, great landsnails. Take a look.

Murex1Man@cs.com

Species List, San Blas Is., Panama Trip, June 9-15, 2003

Species collected by day and night snorkeling from shallow coral reefs, coralline sand/grass, and sandy intertidal areas by the group of 20.

List compiled by P. Fallon. Identifications by various.

Family / Genus/Species Authority	Notes
Lottiidae	
Lottia leucopleura? (Gmelin, 1791)	Exterior almost smooth; all white, no radiating black lines
Patelloida pustulata (Helbling, 1779)	
Fissurellidae	
Diodora listeri (Orbigny, 1842)	
Diodora minuta (Lamarck, 1822)	
Diodora dysoni (Reeve, 1850)	Almasi coll.
Fissurella angusta (Gmelin, 1791)	
Fissurella cf. fascicularis? Lamarck, 1822	
Hemitoma octoradiata (Gmelin, 1791)	
Lucapina sowerbii (Sowerby, 1835)	
Turbinidae	
Astralium phoebium (Röding, 1798)	
Eulithidium adamsi (Philippi, 1853)	Micro-mollusk
Eulithidium bellum (M. Smith, 1937)	Micro-mollusk
Lithopoma caelatum (Gmelin, 1791)	
Lithopoma tectum (Lightfoot, 1786)	
Turbo castanea Gmelin, 1791	
Liotiidae	
Marevalvata tricarinata (Smith, 1871)	Micro-mollusk
Arene cruentata (Mühlfeld, 1829)	Zylman coll.
Arene sp. 1 of Panama	Micro-mollusk
Trochidae	
Calliostoma javanicum (Lamarck, 1822)	Vander Ven coll.
Calliostoma euglyptum (A. Adams, 1855)	Almasi coll.
Cittarium pica (Linnaeus, 1758)	Bender coll.
Synaptocochlea picta (d'Orbigny, 1842)	Micro-mollusk
Tegula fasciata (Born, 1778)	Large adults typical coloration; juveniles red or orange.
Neritidae	
Vitta virginea (Linnaeus, 1758)	
Smaragdia viridis (Linnaeus, 1758)	Micro-mollusk
Cerithiidae	
Cerithium eburneum Bruguière, 1792	
Cerithium litteratum (Born, 1778)	
Modulidae	
Modulus modulus (Linnaeus, 1758)	
Littorinidae	
Echinolittorina tuberculata (Menke, 1828)	
Strombidae	
Strombus costatus Gmelin, 1791	
Strombus gigas Linnaeus, 1758	Bender coll.
Strombus pugilis Linnaeus, 1758	
Strombus raninus Gmelin, 1791	
Hipponicidae	
Hipponix antiquatus (Linnaeus, 1767)	
Cypraeidae	
Luria cinerea (Gmelin, 1791)	
Macrocypraea zebra (Linnaeus, 1758)	
Ovulidae	
Cyphoma gibbosum (Linnaeus, 1758)	
Triviidae	
Trivia pediculus (Linnaeus, 1758)	
Naticidae	
Natica livida Pfeiffer, 1840	
Natica tedbayeri Rehder, 1986	
Polinices lacteus (Guilding, 1834)	
Bursidae	
Bursa granularis (Röding,1798)	
Bursa thomae (d'Orbigny, 1842)	
Cassidae	
Cassis flammea (Linnaeus, 1758)	Bender coll.
Cassis madagascariensis Lamarck, 1822	Bender coll.
Cassis tuberosa (Linnaeus, 1758)	
Cypraecassis testiculus (Linnaeus, 1758)	
Harpidae	
Morum oniscus (Linnaeus, 1767)	
Ranellidae	
Cymatium martinianum (d'Orbigny, 1846)	
Cymatium nicobaricum (Röding, 1798)	
Cymatium occidentale (Mørch, 1877)	
Charonia variegata (Lamarck, 1816)	Bender coll.

Tonnidae

Tonna pennata (Mørch, 1852)	The old name is *Tonna maculosa* (Dillwyn, 1817).

Triphoridae

Iniforis turristhomae (Holten, 1802)	Micro-mollusk
Nototriphora decorata (C. B. Adams, 1850)	Micro-mollusk

Epitoniidae

Epitonium worsfoldi Robertson, 1994	Rhode coll.

Muricidae

Favartia cellulosa (Conrad, 1846)	
Haustellum messorium (Sowerby II, 1841)	Hamilton coll.
Mancinella deltoidea (Lamarck, 1822)	
Morula nodulosa (C.B. Adams, 1845)	
Muricopsis warreni? Petuch, 1993	Not *Muricopsis huberti* Radwin & D'Attilio, 1976.
Phyllonotus pomum Gmelin, 1791	
Pterotyphis triangularis (A. Adams, 1855)	Almasi coll.
Risomurex caribbaeus (Bartsch & Rehder,1939)	Was called *Risomurex muricoides* (C.B.Adams, 1845).
Risomurex deformis (Reeve, 1846)	Often misidentified as *Risomurex schrammi* (Crosse, 1863).

Coralliophilidae

Babelomurex mansfieldi (McGinty, 1940)	Almasi coll.
Coralliophila galea (Dillwyn, 1823)	Formerly called *C. abbreviata* (Lamarck, 1816).
Coralliophila caribaea Abbott, 1958	

Buccinidae

Bailya intricata (Dall, 1884)	
Colubraria testacea (Mørch, 1854)	
Engina turbinella (Kiener, 1835)	
Pisania pusio (Linnaeus, 1758)	
Pollia auritula (Link, 1807)	

Melongenidae

Melongena melongena (Linnaeus, 1758)	Bender coll.

Columbellidae

Columbella mercatoria (Linnaeus, 1758)	
Conella ovuloides (C. B. Adams, 1850)	
Costoanachis catenata (Sowerby I, 1844)	Almasi coll.
Mitrella ocellata (Gmelin, 1791)	Vander Ven coll.
Steironepion moniliferum (Sowerby I, 1844)	
Zafrona dicomata (Dall, 1889)	Almasi coll.
Zafrona pulchella (Blainville, 1829)	

Nassariidae

Nassarius paucicostatus (Marrat, 1877)	
Nassarius consensus (Ravenel, 1861)	Almasi coll.

Fasciolariidae

Terelatirus cayohuesonicus? (Sowerby III, 1878)	May be a new species.
Fasciolaria hollisteri Weisbord, 1962	Vander Ven coll.
Latirus cuna Petuch, 1990	Zylman coll.
?*Latirus angulatus* (Röding, 1798)	? coll.
Leucozonia ocellata (Gmelin, 1791)	
Leucozonia nassa (Gmelin, 1791)	

Volutidae

Enaeta reevei? (Dall, 1907)	Small, immature specimen.

Marginellidae

Granulina ovuliformis (Orbigny, 1841)	Micro-mollusk
Hyalina pallida (Linnaeus, 1758)	Almasi coll.
Prunum amabile (Redfield, 1852)	
Prunum guttatum (Dillwyn, 1817)	
Prunum pruinosum (Hinds, 1844)	
Prunum roscidum? (Redfield, 1980)	Like small *guttatum* with white specks.
Pugnus serrei (Bavay, 1911)	Micro-mollusk
Volvarina affinis (C. B. Adams, 1861)	Almasi coll.
Volvarina albolineata (d'Orbigny, 1842)	Almasi coll.
Volvarina avena (Kiener, 1834)	
Volvarina subtriplicata (d'Orbigny, 1842)	Micro-mollusk

Olividae

Oliva reticularis ernesti Petuch, 1990	Considered one of the many morphs of *O. fulgurator* (Röding, 1798) by Tursch & Greifeneder (2001).

Mitridae

Mitra barbadensis (Gmelin, 1791)	
Mitra nodulosa (Gmelin, 1791)	

Vexillidae

Vexillum sykesi (Melvill, 1925)	
Vexillum dermestinum (Lamarck, 1811)	Vander Ven coll.
Vexillum gemmulatum (Sowerby, 1874)	Almasi coll.

Turbinellidae

Vasum muricatum (Born, 1778)	
Turbinella angulata (Lightfoot, 1786)	Bender coll.

Cystiscidae

Gibberula lavalleana (d'Orbigny, 1842)	
Persicula fluctuata (C. B. Adams, 1850)	Micro-mollusk

Cancellariidae

Tritonoharpa lanceolata (Menke, 1828)	

Conidae

Conus cancellatus Hwass, 1792	*C. austini* Rehder & Abbott, 1951 is a jr synonym.
Conus glenni Petuch, 1993	
Conus granulatus Linnaeus, 1758	Vander Ven coll.
Conus mus Hwass, 1792	Rhode coll.
Conus acutimarginatus? Sowerby, 1866	Looks like *C. nodiferus* Kiener, 1845 of the Bahamas & Greater Antilles.
Conus puncticulatus Hwass, 1792	Zylman coll., form *columba* (Hwass, 1792)
Conus mappa granarius? Keiner, 1845	Commonly labeled *C. granarius panamicus* Petuch, 1990. ID not confirmed.
Conus regius Gmelin, 1791	
Conus spurius Gmelin, 1791	Vander Ven coll.

Turridae

Drillia cydia (Bartsch, 1943)

Pilsbryspira albocincta (C. B. Adams, 1845)

Daphnella lymneiformis (Kiener, 1840)

Pyramidellidae

Pyramidella dolabrata (Linnaeus, 1758)

Bullidae

Bulla striata Bruguière, 1792

Umbraculidae

Umbraculum umbraculum (Lightfoot, 1786) Zylman coll.

Ischnochitonidae

Ischnochiton erythronotus? (C. B. Adams,1845)

Stenoplax limaciformis? (Sowerby, 1832)

Acanthochitonidae

Acanthochitona spiculosa? (Reeve, 1847)

Mytilidae

Modiolus americanus (Leach, 1815)

Arcidae

Anadara notabilis (Röding, 1798)

Arca zebra (Swainson, 1833)

Barbatia cancellaria (Lamarck, 1819)

Barbatia domingensis (Lamarck, 1819) Almasi coll.

Barbatia tenera (C. B. Adams, 1845)

Noetiidae

Arcopsis adamsi (Dall, 1886)

Pinnidae

Pinna carnea Gmelin, 1791

Limidae

Ctenoides scabra (Born, 1778)

Ctenoides scabra tenera (Sowerby, 1843)

Lima lima (Linnaeus, 1758)

Pectinidae

Bractechlamys antillarum (Récluz, 1853)	Vander Ven coll.
Caribachlamys imbricata (Gmelin, 1791)	Piech coll.
Caribachlamys ornata (Lamarck, 1819)	

Spondylidae

Spondylus ictericus Reeve, 1856	Piech coll.

Chamidae

Chama macerophylla Gmelin, 1791	Vander Ven coll.

Lucinidae

Parvilucinia costata (d'Orbigny, 1842)

Codakia orbicularis (Linnaeus, 1758)

Codakia orbiculata (Montagu, 1808)

Linga leucocyma (Dall, 1886)

Linga pensylvanica (Linnaeus, 1758)

Crassatellidae

Crassinella lunulata (Conrad, 1834)	Micro-mollusk

Cardiidae

Papyridea soleniformis (Bruguière, 1789)

Tellinidae

Arcopagia fausta (Pulteney, 1799)	
Leporimetis intastriata (Say, 1827)	Vander Ven coll.
Tellina listeri Röding, 1798	
Tellina radiata Linnaeus, 1758	

Psammobiidae

Asaphis deflorata (Linnaeus, 1758)

Veneridae

Periglypta listeri (Gray, 1838)

Notes

Other micro-mollusks have been identified in samples of sediment collected during the trip. Only a few of the more recognizable ones from popular families have been included in this list. All shells are in the author's collection unless otherwise noted. The question mark ("?") is used to denote uncertainty in the identification of the entire binomen (placed before the genus name) or the species name (placed after the species name). See also *American Conchologist* 26(3):24 for an explanation of the use of symbols in the binomen. The chiton identifications are all tentative pending further research.

Identification Sources:

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The Academy of Natural Sciences of Philadelphia on-line database (Malacalog 3) of western Atlantic gastropods published and maintained by Dr. Gary Rosenberg was used to check current names, published distributions, and for sources of information about some of the gastropods appearing on this list. The American Fisheries Society Special Publication 26 by Turgeon et al. (1998) was checked for the current names of other classes of mollusks. Special thanks to Dr. Jon Greenlaw for his assistance on the identifications of the cones.

Any comments or corrections would be appreciated and can be sent by e-mail to pfallon@optonline.net.

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BOOK REVIEW: THE SHELLED MAGELLANIC MOLLUSCA: WITH SPECIAL REFERENCE TO BIOGEOGRAPHIC RELATIONS IN THE SOUTHERN OCEAN

By Katrin Linse, 2002, 252p.with Supplementary Appendix

My interest in the southern oceans has been fostered by my shell collections from South Africa, Australia, New Zealand and recently acquired species of the southern West Atlantic, mainly from Uruguay and Argentina. This book opened up new vistas and information. It opens with a short summary in English and German. The material on which the book is based was collected during five expeditions, mainly to the Straits of Magellan, Beagle Channel, Campo Hjelo Sur and the Weddell Sea. Station lists, sampling gear and handling on board are recorded, as are Phylogeny and Taxonomy methods. The biogeography section shows the faunal relations and shared species in number and percentage of the Magellanic Region to neighboring areas in South America, Antarctica and selected locations in the southern oceans. The chapter on survey areas recalls historic surveys, the geology, topography, hydrography, paleogeology, and paleoclimatology of the Magellanic and Antarctic regions. The section on "Results" contains preliminary identification keys for 285 Magellanic Mollusca. In some taxa where a division at species level is problematic, the key stops at the genus level. A "Systematic Report" and detailed description of 42 species of shelled gastropods and 10 species of bivalves, including 8 new species, 1 new genus, and the generic change of 2 species follows. Information includes the source of the type material and previous distribution records with comparative remarks and distribution maps showing the location of finds.

The last section is "Discussion," where 397 benthic molluscan species are described. (Polyplacophora are excluded due to revision at the time of publication.) Two interesting characteristics of the region are noted: a large number of globally distributed families and a large number of bipolar genera. After an extensive bibliographic list, the glossary includes shell and radula morphology and technical terms. Some 162 black and white plates illustrate the shell and radula morphology of selected Magellanic and Antarctic species described in the text. Regrettably, there is no index in the book and seeking information on specific taxa is both difficult and time consuming. The appendix consists of a species list comprising over a thousand taxa of shelled Gastropoda, Scaphopoda, Bivalvia, and a Biogeographic Database, but these lists must be ordered by E-mail or Fax. This is a most unusual procedure and it is not clear why they were not included in the book as they are integral to the book and of great value and importance. Regrettably, endemic species are not designated in this list.

To sum up, this study, based on research vessel expeditions and a review of the published literature will no doubt help focus attention on one of the most remote and stormy regions of our planet. We must salute Dr. Katrin Linse and all of her colleagues of the British Antarctic Survey, as well as the crews of the vessels who participated in the expeditions, for their efforts under extremely adverse and dangerous climatic conditions.

Zvi Orlin
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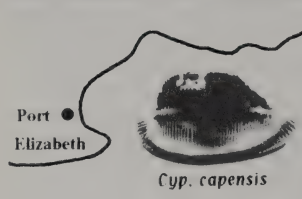

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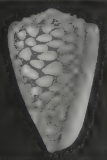

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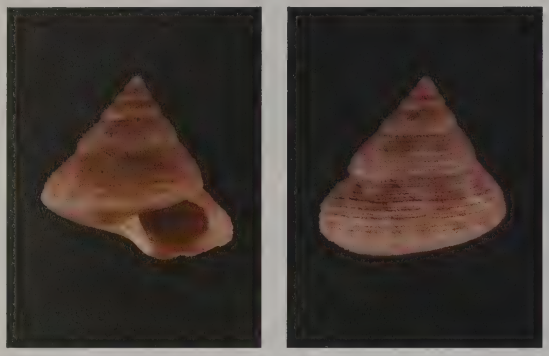
Caribbean Rarities

by Kevan & Linda Sunderland

Specimens illustrated from the collection of Kevan and Linda Sunderland, 9370 NW 39th Street, Sunrise, FL 33351 email: KLShells@mindspring.com. (Ed. note: To date, over 1,000 photographs by the Sunderlands have appeared in American Conchologist!)



1. *Calliostoma* sp., 20 mm, dredged by M/V Oregon from 325 meters in Florida Straits.

2. *Calliostoma alexolssoni* Quinn, 1992, 29 mm, local fisherman from 400 meters, off Santos, San Paulo State, Brazil.

3. *Calliostoma schroederi* Clench & Aguayo, 1938, 22 mm, trawled, research vessel, 450 meters, Paramaribo, Surinam.

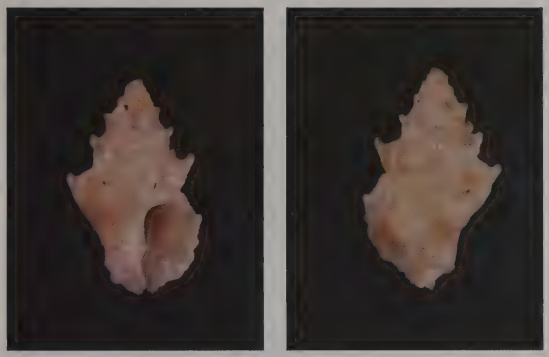
4. *Catageis finkli* (Petuch, 1986), 19 mm, dredged, research vessel from 80 meters, off Golfo de Darian, Eastern Panama.

5. *Casmaria* sp., 29 mm, dredged from 360 meters, off Roatan, Honduras.

6. *Sconsia alexarthuri* Parth, 1994, 40 mm, taken in baited trap set in 170 fathoms, off US Virgin Islands.

7. *Hadroocorys verrillii* (Dall, 1889), 40 mm, dredged from 260 meters of water, Mangrove Bight, Roatan, Honduras.

8. *Attiliosa bessei* E. H. Vokes, 1999, PARATYPE, 18 mm, lobster fisherman, 30 meters, Rosalind Bank, Honduras.



9. *Attiliosa kevani* E. H. Vokes, 1999, PARATYPE, 16 mm, lobster fisherman from 25 meters, Montego Bay, Jamaica.

10. *Fasciolaria tephrina*, de Souza, 2002, PARATYPE, 155 mm, fish trap from 420 meters, off Roatan, Honduras.

11. *Lyria vegai* Clench & Turner, 1967, 38 mm, lobster trap in 300 meters, off La Parcuera, Puerto Rico.

12. *Volvarina hennequini* Boyer, 2000, 15 mm, dredged from 625 meters, off Puerto Cortes, Honduras.

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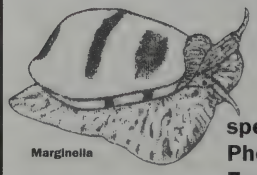

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On the Trail of an Australian Cowry: *Notadusta eugeniae* Cate,1975

By
Don Cram

Crawford Cate described this cowry as collected at or below the low tide line at Hopetoun, Western Australia. He named it *Notadusta eugeniae*, a new species described in *The Veliger* in 1975. The holotype is in the Los Angeles County Museum, Reg. No. LACM 1704, with three paratypes listed in the collections of Dr. Lawrence Kienle, Cherry Hill, New Jersey; Elsie Malone; and Eugenia Wright, of Sanibel, Florida, after whom the shell was named. Dr. C.M. Burgess in *Hawaiian Shell News* in 1977 determined it to be a synonym of *Notocypraea declivis* (Sowerby, 1870) and repeated this in his *Cowries of the World* in 1985.

Most authors have generally accepted the Burgess determination, but I have always had doubts, as *N. declivis* does not occur any further west than around Adelaide, in southern Australia. I became more curious as to its identity when Hubert and Lorenz in both editions of their book *A Guide to Worldwide Cowries* in 1993 and 2000 listed it as a synonym of *Erronea xanthodon*, which is the only endemic tropical Australian cowry and is restricted to the coastal area of eastern Queensland and northern New South Wales.

In January of this year at my request, Dr Robin Wilson of Museum Victoria arranged for the holotype to be sent to Melbourne for study. To our surprise the shell is not a *Notocypraea*, but is similar in weight, tooth count, and shape to *C. xanthodon,* although differing considerably in dorsal coloration. The dorsum is an orange beige color, with a broad 6 mm transverse band of a darker rosy red and an additional narrower band towards the posterior. The surface is very finely mottled. It has a rounded labial margin, not reflected as in *Notocypraea*, and three prominent rosy red spots on this margin with one each side of the anterior terminal tip. The shell has a heavy porcellaneous coating that is polished and glossy, weighs 2.99 grams, and is 26.8 mm long, 16.8 mm wide and 13.5 mm high. It has 25 labial teeth (not 28 as in the original description, which must have been a misprint) and 17 columellar teeth. The teeth in the fossula area are not concave as in *Notocypraea*, and the base, shell margins, terminal tips, and teeth are ivory beige.

As *N. comptonii* and *N. piperita* are the only comparable *Notocypraea* species that are found in that area, a single live taken specimen of similar dimensions of both *E. xanthodon* and *N. comptoni* were first selected for detailed study. The specimen of *N. comptonii* from Bicheno, Tasmania, was the heaviest relative to the size available. A larger series of shells was then studied and the results are listed on the table (page 21), that is similar to, but modified from, that used by R.J Griffiths in his 1962 review of *Notocypraea.* It can be seen from this table that, combined with the dorsal gloss and coloration and the shell and fossula shape, the columellar teeth are too coarse and the shell is far too heavy for *N.eugeniae* to be a *Notocypraea.* It appears to be a valid species similar to but specifically different from *E. xanthodon* that has been overlooked for 28 years.

Albany, Western Australia, as far as I can ascertain, is the farthest east in the Southern Ocean which any tropical cowries have been recorded, and Hopetoun is 250 kms farther east. It appears from his article in *Hawaiian Shell News* that Dr. Burgess did not examine the type, but listed it as a synonym of *N. declivis* from the photo accompanying the original description. To the best of my knowledge this shell has not been recorded since the original description, and the three paratypes are the only other specimens known. I can only assume it is extremely rare, overlooked, or its habitat has not been searched, as Hopetoun is 50 km off the main highway between Albany and Esperance. Even if the locality is incorrect, I have not seen anything like this shell.

In an endeavor to find the whereabouts of the three paratypes, I contacted Dr. José Leal at the Bailey-Matthews Shell Museum in Florida. Although Elsie Malone donated some specimens of *Cypraea* to the museum, none was related to this species. Lindsay Groves at the LACM, who sent the holotype to

The holotype of *Notadusta eugeniae* Cate, 1975. A combined image of multiple views of a single specimen. Dr. C.M. Burgess synonymized it with *Notocypraea declivis* (Sowerby, 1870) in 1977. Later, Hubert and Lorenz, in both 1993 and 2000, synonymized it with *Cypraea xanthodon* Sowerby, 1832.

Melbourne, also cannot assist with their location. I would appreciate it if anyone who can help with the location of these paratypes or who knows of any other specimens could contact me. If no other specimens are found, this shell could forever remain a mystery.

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Left are the three Cypraeidae involved in the comparison with *Notodusta eugenine.* Top row: *Notadusta comptoni*, middle row: *Notadusta piperata*, and bottom row: *Erronea xanthodon.*

Table of selected values on four similar Australian Cypraediae.

Serial	*N. eugeniae* Holotype		*E. xanthodon* Selected shell		*N. comptoni* Selected shell		*E. xanthodon* 6 shells		*N. comptoni* 20 shells		*N. piperata* 25 shells	
1 L	26.8		26.7		27.2		27.5	2.4	24.9	2.7	22.5	2.3
2 W	62.7	(16.8)	61.4	(16.4)	64.3	(17.5)	61.8	2.2	61.9	2.1	60.5	2.0
3 H	50.4	(13.5)	50.2	(13.4)	48.5	(13.2)	49.7	1.0	47.9	1.3	46.9	1.4
4 LT	24.6	(25)	20.5	(21)	27.2	(28)	21.2	.37	25.1	2.1	25.3	1.5
5 CT	16.8	(17)	17.6	(18)	21.4	(22)	16.5	.87	21.5	1.5	22.5	1.1
6 Wt	1.55	(2.99)	1.44	(2.75)	1.27	(2.56)	1.37	.17	1.14	.23	1.16	.21

1 Length of shell in mm for single shell. Mean value and standard deviation given for multiple shells.

2&3 Percentage of total length and actual size in mm given for single shells; mean length in mm and standard deviation given for multiple shells.

4&5 Number of labial teeth and columella teeth reduced or increased to those of a shell 25 mm long as per Schilder & Schilder, 1938. For formula see Cernohorsky, 1971. Actual tooth counts given in parentheses for single shells; mean value of formula and standard deviation given for multiple shells

6 Weight of shell in grams divided by L cubed; multiplied by 10,000 to facilitate handling of results. Actual weight in grams given in parentheses for single shells; mean value of formula and standard deviation given for multiple shells. Actual tooth count, size in mm, and weight in grams follow in brackets for single selected shells.

Conchologists of America

(left) Mr. Vince Lester presenting Jonathan Mason with the COA Award at the 2003 Keppel Bay Shell Show. Twelve-year-old Jonathan Mason, a fourth-generation shell collector, won the COA Award for his exhibit "Where I Find Shells" at the Keppel Bay Shell Show in Australia on July 12-13 of this year. Jonathan had to compete against adults in the Educational Category. He enjoys this competition because, as he says, "I can use a bigger display case and put more shells in it." This young collector won ribbons in 3 other divisions as well. Congratulations Jonathan on your win, the 1st of many I am sure!

(top left, page 23) Bob Granda wins the COA Award at the Gulf Coast Shell Show. His display was 15 cases (30 ft.) of Philippine land shells. He displayed them geographically and used "Shells of the Philippines" to define the geographical areas. The three main areas are the Luzon Island Group (the northern islands of Luzon, Batanes, Romblon, Mindoro, Marinduque, Masbate, Catanduanes, Corregidor, and Palawan), the Visayan Island Group (the central islands of Cebu, Samar, Negros, and Panay), and the Mindanao Island Group (the southern islands of Mindanao, Camiguin, Basilan, and the Sulu Archipelago). The title of the display was Snailing The Philippines.

(below) John Timmerman with the beautiful newly designed COA Award. At the North Carolina Shell show held on October 10-12, 2003, COA member John Timmerman was awarded the COA for his exhibit "Trumpeting Tritons." John featured 20 specimens and information about localities, ecology, morphology and man's use of these shells. John was especially pleased to win this year's COA trophy as it featured his new design!

Award Winners

by Charlotte Lloyd

(above) Bob Granda - see caption to the left on page 22.

(above) Jim Cordy wins the COA Award at the Orlando Shell Festival. He also pulled in the duPont, Mote Gold, and Smithsonian Institution Awards, and the Master's Trophy for his 65-foot 26-case exhibit "All the Shores I've Known Before." Jim exhibited self-collected shells from the California, Panamic, Caribbean and Indo-Pacific provinces. Quite an accomplishment for the Cordys.

(below) This is a shot of Gene Everson on July 16th at Annapolis, Sinclair Inlet, Kitsap County, WA. He is about to go shoulder-deep into the mud chasing an elusive bivalve. Readers of *American Conchologist* have seen Gene countless times on the COA Award Winner's page. He has a superb collection of mostly self-collected material and a flair for presentation that he combines for winning displays. The picture in the mud is just to show a dedicated sheller at work.

Gene Everson wins the COA Award at the Jacksonville Shell Show, June 28-29. The show had a full auditorium of exhibits and dealers and a record attendance. Gene Everson won the COA (plus "Shell of the Show" and "Florida/Caribbean Shell of the Show") with his exhibit "Exceptional Shells." This exhibit contained shells that are exceptional because of record size, rarity, freak color or sculpture. Super job Gene! (Ed. Note: With Gene is Charlotte Lloyd, the author and compiler of the COA Award page. Thanks for a great job Char!)

Shell Collecting in Iceland

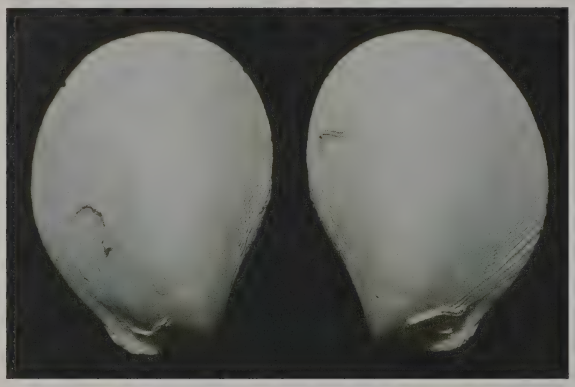
Part III One Micro & Six Bigger Shells

Moshe Erlendur Okon

P.O.Box 7803, Jerusalem, Israel E-mail: erlend@netvision.net.il

In this section, some of the larger shells found in the cold Icelandic waters are illustrated, as well as the most common micro shell. Although some are deep-sea species, others can be found in shallow waters or even intertidal. The size and locations mentioned refer to the largest specimen shown. All shells are in my reference collection.

Acesta excavata (Fabricius, 1779), 132 mm, (below), trawled off Hofn, South Iceland. A Limidae, this deep water bivalve (several hundred meters) is known in Iceland only from the south. It is a bycatch of the crayfish industry, but quite rare. The radial ridges are absent from the middle third of the shell.



Arctica islandica (L., 1767), 113 mm, (below) found on the shore of Geldinganes Peninsula, West Iceland, after a storm. This bivalve lives in mud, sand or gravel bottoms, from the intertidal zone down to about one hundred meters depth. It is recognized by its thick dark periostracum (light brown in younger specimens) that flakes off when dry. It is occasionally used as food in Iceland, although the meat is tougher than that of other available clams. *A. islandica* can be found all around the island and is one of the longest living molluscs in the world. Larger specimens are over one hundred years old, and there is a report of a live taken shell that was 225 years old (Ropes, 1996)! The growth rings are clearly visible on the illustrated specimen.

Colus islandicus (Gmelin, 1791), 135 mm, (above) trawled at 350 meters off Langanes, North East Iceland. This *Colus* species has a thin periostracum and a straight siphonal canal. The shell is quite fragile. Older specimens sometimes have marine growths attached to them.

Modiolus modiolus (L., 1758), 120 mm, (above), found in *Laminaria digitata* kelp fasts on the shore of Seltjarnarnes, west Iceland, after a storm. This is a common bivalve and can easily be identified by the brittle periostracum and the pink-purple tones on the white shell. It lives attached to rocks, but kelp will often fasten to it, both later being uprooted by violent storms.

Neptunea despecta (L., 1758), 156 mm, (above) trawled off Hofn, South Iceland. This common species can be found all around the island, from shallow waters to several hundred meters depth. It is extremely variable and several forms have been named. The whorls may be smooth, channeled, or knobbed; the shell squat or elongate. Notice the perfect bulbous protoconch on the smaller specimen.

Onoba aculeus (Gould, 1841), 3 mm, (above) found under stones still submerged in water at low tide on the island of Grota, West Iceland. This micro shell is common all around Iceland, except in the south. The enlarged image clearly shows the periostracum and operculum as well as the channeled sculpture on the five whorls.

Volutopsius norvegicus (Gmelin, 1791), 90 mm, (above) trawled at 610 meters north of Siglufjordur, North Iceland. This deep-water shell is rather uncommon, but can be found around the entire island. It has an inflated shape and an elegant rounded protoconch.

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The Shell Clubs of Pinellas County, Florida: Suncoast Conchologists and St. Petersburg Shell Club, cordially invite you to the COA Convention for **Sun, Fun, and Shells** at the Grand Hyatt Tampa Bay, June 26-July 2, 2004.

by Alice Monroe

As the theme suggests, plenty of **Sun, Fun,** and **Shells** will be in store for you at the 2004 COA Convention. The **Fun** will officially begin on Sunday, June 27, at 1:00 p.m. with the welcome and opening ceremonies, but you will undoubtedly want to arrive early to take advantage of pre-convention field trip opportunities, club sales tables, and early bird **Shell** specials.

Pre-Convention Field Trips. Four field trips will be offered on **Saturday, June 26**: a dive trip, a fossil collecting trip, a swimming/beachcombing/snorkeling trip, and a trip to the sponge docks of Tarpon Springs. These trips will leave the hotel at 6:30 a.m. (dive trip), 7:00 a.m. (fossil trip), 8:30 a.m. (swimming, beachcombing, and snorkeling), and 9:00 a.m. (Tarpon Springs). Friday arrival is suggested for field trip participants. Convention hosts will be available to register field trip participants and answer questions. Registration on Saturday will be open 3:00-7:00 p.m.

The Fun Officially Begins Sunday, July 27. The COA Board will meet at 7:00 a.m. Registration and the first silent auction will begin at 9:00 a.m. in the hotel lobby. Club sales tables will be available from 9:00 a.m.-12:00 p.m. Opening ceremonies will begin at 1:00 p.m. followed by an afternoon of programs. The Beach (Welcome) Party will begin at 6:30 p.m. in the hotel ballroom. Festive tropical beach attire for a **Sun**-sational time is appropriate.

Programs. **Shell**-related programs will be Sunday afternoon, all day Monday, and Tuesday and Wednesday mornings. Special **Shell** seminars will be held Tuesday afternoon.

Verbal Auction. The verbal auction of **Shells** and **Shell**-related items will be Tuesday evening. A cash bar and snacks will be available.

Snails on Parade. For the first time ever at a COA Convention, you are invited to enter snail figurines in this **Fun** event. Anyone who wishes to enter must complete an application. Convention registrants will vote for winning snails and awards will be presented in 5 categories.

Convention Field Trips. Two field trips will be offered the evening of **Wednesday, June 30.** A collecting trip to the sand and grass flats at the south end of the Skyway Bridge will feature an unusually good summer low tide as the **Sun** sets. Dinner and collecting buckets will be provided. The other field trip option will be a **Sun**set dinner cruise out of Clearwater Beach. Two field trip options will be offered the morning of **Thursday, July 1.** One is a behind-the-scenes tour of the Florida Aquarium in Tampa, and the other is a visit to the Pinewood Cultural Park in Largo. Field trip participants will be back at the hotel prior to the opening of the bourse.

Bourse. The bourse will begin Thursday, July 1, at 2:00 p.m. and last until 9:00 p.m. and continue on Friday, July 2, 9:00 a.m.-12:00 p.m. Featured at the bourse: **Shells, Shells,** and **Shells** in greater than 10,000 square feet of sales space.

Banquet. The banquet will begin at 6:30 p.m. Friday, July 2, and will feature Jerry Harasewych of the National Museum of Natural History, Smithsonian Institution, as speaker.

Grand Hyatt Tampa Bay. The hotel is located on a 35-acre nature preserve on the northeastern shore of Upper Tampa Bay, just minutes from Tampa International Airport. At the hotel you will enjoy newly redesigned accommodations, magnificent views, and award-winning cuisine. A variety of accommodations are available at the Hyatt. Standard hotel rooms with 2 double beds or a king-size bed are $95 per night for up to 4 people. Suites are available in 3 sizes for $250-790. Apart from the hotel there are condo-like casitas that are $315-$395. These rates are available up to two nights prior to and two nights after the convention dates. Be sure to mention the COA Convention when you make reservations in order to receive these special rates.

Do you want to help ensure a successful convention?

Register and attend the convention—your presence is important to us.

Donate shells or shell-related items for the auctions—all proceeds fund molluscan research.

Be a jewel and become a Jewel Box, or an Angel Wing, or even a Golden Olive with a cash donation, which will be used to purchase awards, auction snacks, and decorations for the convention events.

Directions to the Grand Hyatt Tampa Bay:

If you arrive by car. From South Florida, go north on Interstate 75. Take the I-275 N exit to St. Petersburg and go over the Skyway Bridge. Stay on I-275 and cross Tampa Bay (Howard Frankland Bridge). Take the SR 60 W (Cypress St.) exit and stay on SR 60 W. State Road 60 is also called the Courtney-Campbell Causeway

when it crosses Tampa Bay. Grand Hyatt Tampa Bay will be on the left before you cross back over Tampa Bay. **From Central and East Florida**, take Interstate 4 west to Tampa. As you approach Tampa, merge left onto Interstate 275 S. Take exit 39 which will say Airport, Clearwater, SR 60 W. State Road 60 is also called the Courtney-Campbell Causeway when it crosses Tampa Bay. Grand Hyatt Tampa Bay will be on the left before you cross Tampa Bay. **From North Florida**, either go south on Interstate 75 and take Interstate 275 through Tampa to exit 39 as mentioned above, or go south on US Hwy 19 to SR 60 E, which is also called Gulf-to-Bay Blvd. Turn left on Gulf-to-Bay Blvd. which becomes the Courtney-Campbell Causeway across Tampa Bay. The Grand Hyatt is located on the east end of the Courtney-Campbell Causeway.

If you arrive by plane. The closest airport is Tampa International Airport. At the baggage claim area is a hotel information center with courtesy phones so you can contact the Grand Hyatt for free shuttle service to the hotel. The hotel is approximately 10 minutes from the airport. If you fly in to the St. Petersburg-Clearwater International Airport, you can arrange for shuttle service (approximately 25 minutes) to the Grand Hyatt through SuperShuttle at a cost of $17.00 each way. Reservations are not required but can be made at www.supershuttle.com or by calling (800) 282-6817. Car rental agencies are available near the baggage claim areas of both airports.

The Tampa Bay area also has many attractions and activities to see and do on your own, including Busch Gardens, Lowry Park Zoo, MOSI (Museum of Science and Industry), Ybor City, Tampa Museum of Art, the Salvador Dali Museum, Major League Baseball, golfing, deep-sea fishing, and many miles of beaches to enjoy.

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My Favorite Shell - *Trona stercoraria* (L., 1758)

By Guy Guerrero

France

The common name for my favorite shell is the "fecal colored cowrie"' or the "rat cowrie." This shell offers a superb variation of marbled or mottled patterns with shades of rust, brown, green, black, and white. It also varies greatly in size with adult specimens ranging from 30 mm to 100 mm. The margined base is decorated with beautiful teeth, which terminate at the pronounced fossula.

Thanks to my friend Marcel Pin, from Dakar, Senegal, and his numerous collecting trips, my collection contains a wide assortment of these jewels. It may not be one of the "top ten" on dealers' lists, but in my eyes this is truly a beautiful seashell.

2004 SHELL SHOWS & RELATED EVENTS

Following advance information is subject to change. Please verify with individual organization

Jan. 17-18 CENTRAL FLORIDA SHELL SHOW, Orlando, FL
Central Florida Fairgrounds, Exhibition Hall A, 4603 W. Colonial Drive
Helen Kwait, 1329 Sterling Oaks Drive
Casselberry, FL 32707
E-mail: dekwait@netscape.net (407) 695-3887

Jan. 24-25 SPACE COAST SHELL FESTIVAL, Melbourne, FL
The Melbourne Auditorium, 625 E. Hibiscus Blvd.
Jim & Bobbi Cordy, 385 Needle Blvd.
Merritt Island, FL 32953
E-mail: corshell@earthlink.net (321) 452-5736

Jan. 30-Feb. 1 BROWARD SHELL SHOW, Pompano Beach, FL
Pompano Beach Recreation Center, NE 18th Av. & NE 6th St.
Jim VunKannon, 2219 NE 16th Court
Ft. Lauderdale, FL 33305 (954) 561-0120

Feb. 13-15 SARASOTA SHELL SHOW, Sarasota, FL
Sarasota Municipal Auditorium, Tamiami Trail
Lynn Gaulin, 4407 33rd Ct. East
Bradenton, FL 34203
E-mail: shellhunter@att.net (941) 755-1270

Feb. 20-22 NAPLES SHELL SHOW, Naples, FL
The Nature Conservancy, 14th Avenue N.
Gary Schmelz, 5575 12th Ave. SW
Naples, FL 34116
E-mail: schmelz@att.net (941) 455-4984

Feb. 27-29 ST. PETERSBURG SHELL SHOW, Treasure Island, FL
Treasure Is. Community Center, 1 Park Place
Bob & Betty Lipe, 348 Corey Avenue
St. Petersburg Beach, FL 33706 (727) 360-0586; FAX: 360-3668
E-mail: rlipe1@tampabay.rr.com.
Exhibits accepted at web site: http://web.tampabay.rr.com/shellclub

Feb. 28-29 XVIéme RECONTRES INTERNATIONALES DU COQUILLAGE, Paris, France
Bourse de Commerce, 2 rue des Viarmes, 75004 Paris, France
(Note: new venue for 2004)
M. & D. Wantiez, 88, Rue du General Leclerc
95210 Saint Gratien, France
E-mail: wantiez.mada@libertyserv.fr
33 (1) 34-17-00-39

Mar. 4 - 6 SANIBEL SHELL SHOW, Sanibel, FL
Sanibel Community Center, Periwinkle Way
Anne Joffe, 1163 Kittiwake Circle
Sanibel, FL 33957
E-mail: Sanibel@aol.com (239) 472-3151

Mar. 11-13 MARCO ISLAND SHELL CLUB SHOW XXIII, Marco Island, FL
Wesleyan United Methodist Church, Barfield Road
Jean Sungheim, P.O. Box 633
Marco Island, FL 34146
(941) 642-7247

Mar. 20-21 FIFTH AUSTRALIAN NATIONAL SHELL SHOW, Morphettville, S. Australia
Morphettville Race Course
Wayne Rumball – (8) 8381-3987,
fax: (8)8387-4956
Peter Hunt – (8) 8387-6492
E-mail: hunt.trottpk@chariot.net.au

May 8 - 9 XIV BELGIUM INTERNATIONAL SHELL SHOW, Antwerp, Belgium
Sporthal Schijnpoort, Schijnpoortweg 55-57, Antwerpen
R. De Roover, Vorsterslaan 7
2180 Ekeren-Donk, Belgium
E-mail: bvc.deroover@village.uunet.be
32 (3) 644-3429

Jun. 27 – Jul 2 **CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION,** Tampa, FL
Grand Hyatt Tampa Bay, 6200 Courtney Campbell Causeway, Tampa, Florida
Betty Lipe, 11771 96th Place
Seminole, FL 33772-2325, USA
E-amil: rlipe1@tampabay.rr.com (813) 391-2197

Jul. 11-16 **UNITAS MALACOLOGIA – World Congress of Malacology**, Perth, Australia
The University of Western Australia, Perth, W.A.
Dr. Fred Wells, Western Australia Museum
Perth 6000, W.A., Australia
E-mail: wellsf@museum.wa.gov.au

Jul. 17-18 **Jacksonville Shell Show,** Jacksonville Beach, FL
Days Inn Oceanfront Resort, Jacksonville Beach
Charlotte Lloyd, 1010 N.24th St.
Jacksonville Beach, FL 32250 (904) 246-0874
challoyd@bellsouth.net

Jul. 17-18 **Keppel Bay Shell Show,** Yeppoon, Queensland, Australia
Jean M. Offord, 277 McDougall St.,
N. Rockhampton, Qld. 4701, Australia
(7) 4928-3509

Jul. 24-25 **Townsville Shell Show**, Townsville, Queensland, Australia
Cutharinga Bowls Club on Harold Street, West End
Glenda Rowse, 19 Farrell Street
Kirwan 4814, Queensland, Australia
(7) 4773-2817

Jul. 31 – Aug 4 **American Malacological Society Meeting,** Sanibel, Florida
Sun Dial Resort, W. Gulf Road
Dr. Jose Leal, Bailey-Matthews Shell Museum
Sanibel-Captiva Road, Sanibel, FL 33957
E-mail: jleal@shellmuseum.or (239) 395-2233

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A gathering of *Nucella lamellosa* (Gmelin, 1791) from Port Hardy, British Columbia. This incredible color variety was collected by Dan Yoshimoto who reports the area "looked like an ant nest of *Nucella lamellosa* shells, spread over miles!"

Shell Collecting in Fiji

By
David Herman
1511 Dieman Lane
East Meadow, NY 11554

In August of 2003, my wife Sandy and I spent our vacation in Fiji. The last article in American Conchologist referring to shelling in Fiji was by the Broward County Shell Club in 1986. I am sharing the experience of our recent trip to update the readers on shelling in Fiji.

Sandy is not as avid a shell collector as I am, but she is no "shelling widow." She enjoys the shell hunt to some extent and she always enjoys exploring new beaches and experiencing different island cultures. We are not divers so our shelling consists of wading, beachcombing, and some snorkeling.

Our flight from Los Angeles landed in Nadi, on the western portion of the largest Fiji Island, Viti Levu. On that first Sunday we spent some time in the town. Most of the stores were closed but we were able to get some supplies at a supermarket. We then spent the rest of the afternoon just up the road from Nadi at a resort, First Landing in Lautoka. The tide was extremely low and exposed a lot of coral and rocks. In this area of the resort I found *Conus lividus* Hwass, 1792; *Thais tuberosa* Röding, 1798; and various *Cypraea.* We were very encouraged by this first day.

The next four days we cruised the Yasawa Islands on the Mystique Princess of the Blue Lagoon Cruises, stopping at several islands. We passed the island where Tom Hanks filmed Castaway and the island where Blue Lagoon was filmed. Off the Island of Yaqeta I found a number of small cowries.

We visited a native village on the Island of Naviti (northwest of Viti Levu). On the beach near the village I found more small cowries and a nice sized *Trochus maculatus* Linnaeus, 1758. The villagers honored us with a Kava Ceremony, which involved a drink made from a native root. They also entertained us with singing and dancing. As former music teachers, we were both very impressed with their skill at singing in four-part harmony. They presented leis to the women and we all ended up dancing. Afterwards they set up a small straw kiosk to sell local crafts and shells. I could not resist buying a beautiful 14-½ inch *Charonia tritonis* (Linnaeus, 1758) from a lady who said her husband had collected it. Sandy bought some grass skirts for our granddaughters.

Charonia tritonis (Linnaeus, 1758), a souvenir purchased on Naviti Island from the wife of a local fisherman.

The final destination of the cruise was Nanuya Lailai and Suva Point. There at low tide I collected large pairs of *Codakia tigerina* (Linnaeus, 1758), *Scutarcopagia scobinata* (Linnaeus, 1758), *Andara scapha* (Gmelin, 1791), and many color forms of *Strombus gibberulus gibbosus* (Röding, 1798). When we returned to the Lautoka dock the crew sang a farewell to us.

We spent the next three days at the Outrigger Hotel in Sigatoka on the Coral Coast. In this area low tide stretches out for tremendous distances, exposing rocks, tide pools, and coral. Here I found a large *Cypraea tigris* Linnaeus, 1758, under a rock two feet from the shore. I also found *Conus ebraeus* Linnaeus, 1758, and *Trochus histrio* Reeve, 1848. While collecting these I jealously watched someone carrying off a brilliant orange *Terebra dimidiata* (Linnaeus, 1758).

While at Sigatoka we watched a fire-walking exhibition one evening. The young men prepared the fire, heated the rocks, and then danced for some time on red-hot rocks and coals. It is apparently a traditional dance from one of the smaller islands. After the fire-walking there was a show of more typical, or at least less hazardous, dances.

A near perfect, 8 inch *Lambis lambis* (Linnaeus, 1758), from Naigani Island.

The second week of our vacation was spent on Naigani Island, a small island east of Viti Levu. After a "not for the faint of heart" road trip for over 1½ hours on a bumpy unpaved road to the Natovi jetty, we met our ferry to Naigani, a pleasant 30 minute trip. We were met at the resort by more four-part harmony from the hotel staff.

The small Island of Naigani consists of the resort with 18 bures or cottages, a restaurant, and a small village. Because the resort is so small, we quickly got to know the other guests who came from Australia, Japan, China, New Zealand, Italy, and the United States. The resort staff was extremely friendly and capable, doing everything from singing, cooking, and cleaning, to leading tours. One such tour was to the local village where we met the village chief. He was busy doing yard work in the midst of pigs and chickens. One house in the village had a television powered by an outdoor generator. Here the villagers would gather to watch rugby games. Another tour was to the top of the local mountain where we had a beautiful view of most of the island.

The best shelling of the trip was on Naigani Island. Sandy found several excellent specimens of *Conus leopardus* (Röding, 1798). Other species collected included: *Vasum turbinellus* (Linnaeus, 1758); *Mitra mitra* (Linnaeus, 1758); *Turbo petholatus* Linnaeus, 1758; *Cypraea tigris*; *Cypraea annulus* Linnaeus, 1758; *Cypraea lynx* Linnaeus, 1758; *Cerithium nodulosum* (Bruguière, 1792); *Latirus amplustris* (Dillwyn, 1817); *Strombus urceus* Linnaeus, 1758; *Tectus pyramis* (Born, 1778); *Trochus histrio*; *Cymatium tabulata* (Menke, 1843); *Conus generalis* Linnaeus, 1767; *Conus imperialis* Linnaeus, 1758; *Conus ebraeus*; *Conus marmoreus* Linnaeus, 1758; *Conus fulgetrum* Sowerby, 1834; *Conus emaciatus* Reeve, 1849; *Conus flavidus* Lamarck, 1810; *Conus aulicus* Linnaeus, 1758; and a perfect 8 inch *Lambis lambis* (Linnaeus, 1758). Bivalves we collected included: *Fragum fragum* (Linnaeus, 1758); *Pinctada imbricata* Röding, 1798; *Spondylus squamosus* Schreibers, 1793; *Asaphis violascens* (Förskal, 1775); *Codakia tigerina*; *Fimbria fimbriata* (Linnaeus, 1758); and *Scutarcopagia scobinata*.

Low tide on Naigani Island.

On a day trip to the nearby Island of Ovalau, we found large examples of *Trochus niloticus* Linnaeus, 1767, and beautiful *Comptopallium radula* (Linnaeus, 1758). We landed near a small picturesque village with children playing in the streets and Kava roots drying in the sun. From the small village we traveled over mountainous winding roads by truck to the former capital of Fiji, Levuka. This was a whaling port in the nineteenth century and much is still preserved from that era. There were even some simple monuments to commemorate visits of British royalty. In 1882 the capital was moved to Suva because the mountainous terrain around Ovalau limited growth and expansion. We had lunch at the Whale's Tale, a delightful place owned by Australians. Then we headed back to Naigani.

Our last days on Naigani included snorkeling trips to the reef and fishing excursions where we landed three mackerels between us. When we departed, the staff again serenaded us. We headed back to the airport at Nadi, stopping along the way to take photographs and say goodbye to this marvelous Pacific island. We are already talking about next time.

Vol. 32, No. 1, March 2004
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American CONCHOLOGIST

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Quarterly Journal of the Conchologists of America

CONCHOLOGISTS OF AMERICA, INC.

Volume 32, No. 1 March 2004

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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Notes from the editor:

Some of you may notice this edition seems to have more than the usual amount of material penned by yours truly. This is not because I want to fill these pages with my ranting, but rather there was a dearth of outside material. So, if you have a special interest in an area of conchology or a specific family or group or type, why not grab a pen and write it up. This plea is especially sent to all of our professionals out there. Share that knowledge, rewrite a technical piece for the COA; we need a variety of inputs for this magazine. For those of you that might not want to tackle a full article, think about doing a "My Favorite Shell." This should be a very short piece on either a specific favorite species or an individual specimen that has a story behind it.

On a different topic, do not forget the COA 2004 convention! Even if you plan on attending, now is the time to pull out a few shells to donate to the many auctions. If you do not plan on attending, WHAT IS THE MATTER WITH YOU! This is always a grand event that no person interested in shells should miss. But even if you are not planning on attending, send in those shells. Your donation is tax deductible. Send donated shells to: John Jacobs at 202 Soldier court, Seffner, FL 33584-5764.

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Support your 2004 Sun, Fun and Shells COA CONVENTION

The St. Petersburg Shell Club and Suncoast Conchologists, your hosts for the 2004 Sun, Fun and Shells COA Convention, invite your contributions to help defray those many extra convention expenses—awards, auction snacks, decorations, printed materials, etc. If received prior to **May 25, 2004**, donations will be acknowledged in the COA Convention Program booklet.

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Please make your check payable to: 2004 COA Convention, and mail to Conchologists of America, P.O. Box 2394, Palm Harbor, FL 34682.

Your support is appreciated!

Report of the COA Nominating Committee 2004

The committee nominates the following for the 2004-5 Year:

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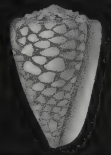

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Front cover: A pair of colorful cold water chitons, *Tonicella insignis* (Reeve, 1847), 30 & 35 mm, from 10 meters, Eider Point, Unalaska Bay, Aleutians. Photo by Roger Clark [insignis@charter.net], Alaska.

Back cover: *Conus tessulatus* Born, 1778. This image clearly shows the siphon (white with a black bar in the upper portion of the siphonal canal), the extended proboscis, and a short eye tentacle. Photo by Jim Miller, see story on page 4.

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Back in Baja Again

By Jim Miller

As 2003 started winding down I was working two, and sometimes three, jobs at a time. My wife, Margo (bless her) said, "We're going to Baja! We'll put it on a credit card if we have to, but you need a vacation." Fortunately, we had enough Delta SkyMiles for the round-trip flights, so all we had to put on plastic was our room and our dives. When I told her we were going to Baja, Charlotte Lloyd decided she wanted to join us.

Now despite what you may have heard, we don't go to Baja to collect shells. In fact, even if there were no shells there whatsoever, we would return as often as we could. The reason? Great diving, wonderful sea life (we could dive every day at the sea lion colony and never get bored), the shallow crystal clear lagoons, the food, the warmth of the people, and the whale sharks! This year, the giant plankton-eating behemoths had been particularly plentiful, with several 40+ footers being spotted right near the Cortez Club dock just a week before our trip was planned. So I was hopeful this would finally be our year for a whale shark encounter.

Any time we go on a trip during hurricane season, I worry about being far from home if a big storm hits the Florida panhandle. But I never gave a thought to the possibility of a hurricane hitting Baja. The Sunday before we were to leave, Charlotte called to say Hurricane Marty had just hit La Paz and was moving north through the Sea of Cortez. My response; a heartfelt, "Aaaarrrrggghhh!!!" I immediately called James Curtiss at the Cortez Club and he said to come on down, damage was minimal. Upon arrival, we found the area had taken a more serious hit than originally thought. Instead of staying at La Concha, James put us up in the best hotel in town, Los Arcos, in a huge suite! We regretted not being close enough to walk down to the dive boats, but this was a pretty second choice.

In the morning, we took a cab out to the Cortez Club. On the way we saw some of the damage: flooded streets, mudslides and a lot of debris. The normally blue-green waters of the Bay were now a cloudy brownish gray. We had hoped to see the whale sharks, but we knew we were out of luck on this trip, yet again.

As the Cortez Club did not have power, they used a portable generator to fill tanks one at a time. James asked if we would mind going out for the day to shell the beaches and snorkel at a few spots. That was fine with us, so we grabbed our snorkel gear, hopped on the boat, and headed to Bonanza Beach, three miles of sandy beach on the southeast corner of Isla Espiritu Santo.

After a big storm we assumed there would be shells on the shore. There were, but not as many as we expected, though there was a lot of broken coral that had blown up. Naturally, we all found pieces of what would have been great finds (a huge *Conus dalli*, for example), but the best shells were a few *Cymatium pileare macrodon* and a large *Cypraea annettae* up on the beach. At the tide line, among what had to be thousands upon thousands of large *Nerita scabricosta*, I found two nice *Purpura patula pansa*.

We were relaxing, strolling the beach and enjoying the sunshine, thinking about where we might go next. But when we returned to our "base camp," we saw the tide had gone out so far our boat was now high and dry on the beach. Oops! Our boat captain was upset with himself, but Baja is not a place for a lot of tooth-gnashing and recriminations. We just set about trying to find a way to get the boat back into the water.

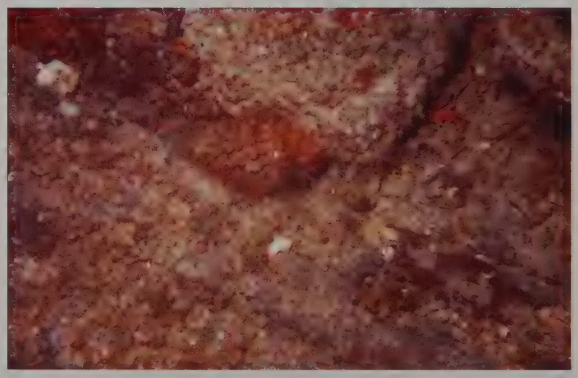

Fig. 1. *Cymatium parthenopeum keenae* (Beu, 1970). This is how the specimen initially appeared to Charlotte. As camouflage goes, this is a pretty good job.

Fig. 2. *Cymatium parthenopeum keenae* showing an intact periostracum and the brilliant colors of the mantle. This subspecies differs from *Cymatium parthenopeum parthenopeum* (Salis, 1793) in possessing six equally wide spiral cords on the final whorl and a shorter siphonal canal and spire.

The bottom line was, we couldn't do it ourselves and it took quite a while to find help, so we were literally stranded in paradise! Eventually a fishing boat came by and we were able to tie a line from their stern to our bow, and with us pushing, we were able to spin the boat around and then out into the water.

By now we were running late, so we only had time for one more stop, which was a wonderful location known as San Gabriel. Charlotte found some huge bivalves that were buried in among small pieces of broken coral, while the first rock I turned over had a *Cymatium pileare macrodon* clinging to it. We also saw starfish of every conceivable size and color, several octopuses, and I chanced upon a sleeping angel shark (rare in this area).

Meanwhile, Margo saw a pod of the smaller manta ray species called mobula or "devil ray," which grow to a wingspread of six feet. As we headed back, we saw quite a few of these rays leaping high out of the water, spinning and then dropping back down. The theory is that these "belly flops" help dislodge parasites.

On our second day, my good friend, Dr. Scott Staab flew in to dive with us. I had not seen Scott since our last trip here in 2000, so that was another happy event. On this day we hit a favorite spot: Los Islotes, which is the main sea lion colony. Usually there are hundreds of sea lions there, but we saw only a few dozen, meaning that many sought shelter from the hurricane in another

Fig. 3. *Hexaplex princeps* (Broderip, 1833). This specimen was particularly striking with the bright white background and contrasting dark brown highlights.

location. Visibility here was down to about 30 feet (normally 60-90 feet). We decided to return later in the week.

Our second stop was at the wreck of the Fang Ming, a Chinese fishing boat that was confiscated by the Mexican authorities and sunk late in 1999. Visibility was rather poor and we had no more than descended to the stern, which is at about 70 feet, when Charlotte reached out and showed me what I feel was the best find of the trip, a huge *Cymatium parthenopeum keenae* with an amazingly thick periostracum (Figs. 1 & 2.). Somehow, no matter where we go, Charlotte is a magnet for the best shells! We were also surprised to find more than a few *Spondylus princeps.* These obviously grow fast, as we saw none in 2000, but now we saw some good-sized specimens. We also saw a number of Pacific lion's paws (*Nodipecten subnodosus*), both in the sand beside the wreck and way up on the deck!

For day three we decided to dive the wreck of the Salvatierra, which is in the San Lorenzo Channel. While this location typically has limited visibility, that day we had at least 100 feet. Jeweled morays seemed to be everywhere, as were huge puffer fish, some as large as four feet. Usually there are nice *Hexaplex princeps* here, but we only saw a few large, heavily encrusted specimens. We did chance upon dozens of *Neorapana tuberculata.*

Coming up the anchor line, about seven of us were doing a safety stop at 15 feet and off in the distance I saw several giant Pacific manta rays. But by the time I alerted the group where to look, they had already sped by on the swift current.

Our second dive was at Swannee Reef. My best find was a rather large *Conus tessulatus* (see back cover), which we managed to photograph with its "tongue" out, sampling the bottom in search of a meal. The number of specimens we found surprised us. These had not appeared in Myra Keene's exhaustive study of tropical West America, though upon returning home, Bill Frank told me this

Fig. 4. *Spondylus princeps* Broderip, 1833. This red shell with orange spines is an unusual color combination.

particular species was discovered in the La Paz / Baja area as far back as 1983.

Day four took us back to the sea lion colony. The visibility had improved and there were many more adults and pups. We took turns shooting stills and video. The pups were quite active and some were grabbing at the handles of my underwater housing. I got some great video.

Our second dive took us back to the Fang Ming. That day we had over 20 divers, so they took us out aboard a huge dive boat that James hired for us. We decided to descend on the anchor line and meet at the bottom. Unfortunately, when we came to the anchor, there was no wreck, only the anchor hanging free in the water. We took a compass reading and eventually found the wreck. Naturally I was hoping for a *C. parthenopeum keenae* of my own. I even swam deep inside the wreck (which I normally don't like to do), but came up empty handed. Oddly, I found an orange *Spondylus princeps* down in the sand at the stern that looked for all the world like it has been pried off with a wide putty knife (Fig. 4.). On the west side of the wreck, *Neorapana tuberculata* seemed to be everywhere, but that side of the wreck had no *Spondylus*.

On our final day, Charlotte decided to stay at the hotel and read. I wanted to hit my "*Spondylus* garden" in hopes of finding more specimens like those I had seen in 2000. The captain anchored too far south, so Margo and I had to break away from the group and head north. As soon as I saw the area, I recognized it (I have some sixth sense about locating specific sites), but instead of being at 90 feet, the area was now at 115 feet, probably as a result of the storm surge from Hurricane Marty.

I did not need to look far, for although a lot of new sand was covering much of the area, the larger *Spondylus* were easily spotted. I even found an enormous *Nodipecten subnodosus* that was at least halfway buried in the sand, so I thought it was dead. But after I dug it up I saw it was indeed a live specimen, nearly the size of a dinner plate! I've found and seen some very large specimens, but this was the largest I had ever seen.

At this point I realized we had been too deep for too long. I looked at my console and was horrified to see I was down to about 400 pounds of air. I motioned to Margo that we needed to head back and do a safety stop of at least five minutes at 15 feet. Back aboard our boat I had us both take some oxygen. We were probably okay, but I would always rather be careful, and my dive computer died the previous day, so I was "winging it" — not a very safe way to dive. I also checked my BC and regulator to see where the air leak had come from; it was the connection between the regulator and the inflator valve on my BC. Time to get a new one.

I could tell you a lot more about the trip, including funny stories about how we dealt with the water rationing at our hotel (including the ice cold showers), our wonderful meals and the warmth of all the people we met during the trip, including divers from Japan, British Columbia and Spain. Despite language barriers, we have always been able to connect at some far deeper human level with all the divers we have ever met and somehow always find a way to communicate and share the joy we feel when diving in this magical place. Having Charlotte along was great, and I sure hope she enjoyed the trip as much as we did. But once again we missed the whale sharks. A perfect reason to go back as soon as we can.

Fig. 5. A very unusual purple *Spondylus princeps*. (Ed. note: according to Lamprell, Kevin (Spiny Oyster Shells of the World: Spondylus, 1987), an earlier homonym (*S. princeps* Schreibers, 1793), which is a different species makes the well-known and widely used name by Broderip invalid. No action seems to have been taken as yet.

Nerita textilis Gmelin, 1791: Description and Range Extension

By
Thomas E. Eichhorst & Katherine Szabó

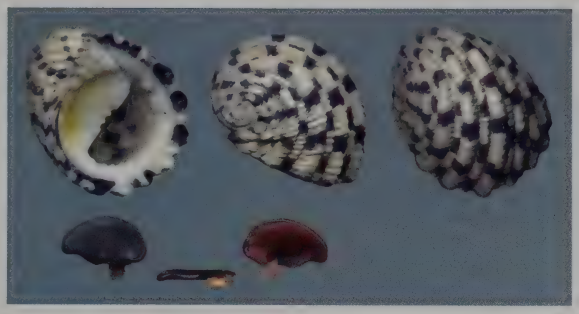

Fig. 1. *Nerita textilis* Gmelin, 1791. A typical 30 mm specimen from Natal, South Africa.

INTRODUCTION

Last summer I received an email asking if *Nerita textilis* (Fig. 1.) occurred in Indonesia. Being uncharacteristically cautious, I responded that *Nerita textilis* was an Indian Ocean shell found from South Africa to the west coast of India, even though early authors listed both Indonesia and the Philippines as localities for this species. I also asked why someone would think the species was found in Indonesia. I was informed that fossils* that seemed to be *Nerita textilis* had been dug up at an archaeological dig in a prehistoric human settlement. The fossils were in a midden (anthropology-speak for human refuse pile or dump) dated 35,000 years ago. One look at a photograph of the fossils (fig. 2) confirmed these were indeed *Nerita textilis*, found more than 3,000 miles east of the eastern limit for the accepted range for this species. The next obvious question was, "Is the species still living in that area?" As it turns out, the answer is "Yes," and we can extend the range of this species to the Indonesian area. An abbreviated version with some of the correspondence may be found at the Molluscan Forum web site hosted by Sow-Yan Chan (*Nerita textilis* thread, http://www.molluscan.com/forum/cgi-bin/dcforum/dcboard.cgi).

ARCHAEOLOGICAL FINDS & HUMAN PREDATION

By now I was in direct email contact with Katherine Szabó, the archaeologist who first reported these wayward fossils. She worked a number of sites in Indonesia and reported that while fossil *Nerita textilis* were found at the older sites, sometime after 10,000 years ago they seemed to disappear. This mystery just kept getting better and better.

The main site where the fossils were found was a limestone cave on the north coast of East Timor, about one km from a narrow ocean reef. In layers radiocarbon dated to between 30,000 to 35,000 years ago there were literally hundreds of *Nerita textilis* in the midden. In fact, it is by far the most common species represented at the site. It is worth pointing out that *Nerita textilis* has been reported previously for archaeological sites along the north coast of East Timor; that it was anomalous, however, was not picked up (Glover 1986). Another question from Katherine was, "Are they [*Nerita textilis*] gregarious...perhaps explaining why they are targeted for collection?" In fact, *Nerita textilis* is gregarious and like many *Nerita* species are often found in clusters exposed above the water on intertidal rocks and cliffs. This clustering behavior (more on that later) and the large size of the animal (for a nerite) make it a perfect target, an easily accessible source of protein for early humans.

A 35,000-year-old site is at the early limit for *Homo sapiens* in that area, but is relatively recent in terms of nerite lineage. The fossil record shows nerites can possibly be identified as far back as the Ordovician Period (500-440 million years ago) and were flourishing by the Devonian Period (400-350 million years ago).

Fig. 2. Fossil* *Nerita textilis* from the midden in East Timor dated at 35,000 years ago. These specimens clearly show the morphological features of a typical *Nerita textilis*.

(Bandel, 2001; Bandel & Frýda, 1999; Kano, *et al.*, 2002). They were well established by the time humans came along looking for sustenance.

Human predation upon nerites has a long history and even today many people around the world consider nerites epicurean delicacies, while to others it is a cheap source of protein. Although each individual nerite is small, they are often the most numerous and easily harvested intertidal mollusk. In recent prehistoric times in Papua New Guinea, the four most commonly found nerite species (*Nerita chamaeleon* Linnaeus, 1758; *Nerita polita* Linnaeus, 1758; *Nerita squamulata* Le Guillou, 1841; and *Nerita undata* Linnaeus, 1758) occurred in sufficient biomass to make a "...significant

* Note re 'fossils': Despite being 30-35 000 years old, these *Nerita textilis* specimens are not fossils as such. It's possible that they are partially recrystallized (not yet tested), though the composition is still aragonite/calcite rather than rock or mineral replacement as found in a true fossil.

contribution to the diet of coastal Papuans..." (Morton & Burgin, 1986:134) Schoenberg (1986) reports on four nerites commonly consumed and even sold in local fish markets in Hawaii. The species on the menu include (30 mm) *Nerita polita* (also used for necklaces and bracelets), the 20 mm *Nerita plicata* Linnaeus, 1758 (rare in Hawaii), and the 30 mm *Neritona granosa* (G.B. Sowerby I, 1825) from freshwater streams. Surprisingly however, the diminutive (12 mm) *Nerita picea* Récluz, 1841, was a popular treat – raw or cooked. Schoenberg admits to the need for quite a bit of patience to extract the small animal from the shell. Of these species, only *Neritona granosa* has shown any real decline in numbers and this is likely due to increasing human development rather than over-collecting. Similar findings from Papua New Guinea show the mollusk species gathered for food by the local population today (including *Nerita albicilla* Linnaeus, 1758; *Nerita chamaeleon*; *Nerita polita*; *Nerita undata*; *Nerita squamulata*; *Nerita planospira* Anton, 1839; and *Nerita plicata*) are the same species that were gathered 2,000 years ago (Swadling, 1977).

Ancient man also used nerite shells for decoration and jewelry as well as a protein source. Versteeg & Bubberman (1992, updated Internet version 1998) found huge shell mounds in prehistoric villages in Suriname dated between 10,000 and 1,000 years ago. They determined that "...nerite shells and crabs formed the main source of food" (Versteeg & Bubberman, 1998:3). Mienis (1993) reports on numerous *Nerita sanguinolenta* Menke, 1829, found in gravesites at an archaeological dig at Minshat Abu Omar on the Nile Delta, Egypt. All of the shells had a man-made hole in the middle of the dorsal surface and were used as shell beads. While some shell beads had drill holes, the nerites were rubbed on a stone until a hole was fashioned. Modern researchers found this only took 30 to 45 seconds to accomplish (Mienis, 1993:40). Dockall & Dockall (1994) reported a similar finding at two Texas archaeological sites on the Gulf Coast where they found prehistoric burial sites with shell beads of *Vitta virginea* (Linnaeus, 1758.) These had been drilled and were probably used as appliqué rather than strung as a necklace or bracelet. A quick check of the Internet will show nerites are still used as decoration. This includes one site selling necklaces of strung-together *Vittina coromandeliana* (G.B. Sowerby I, 1836) and another site offering a chandelier made of various species of nerite shells.

Katherine's own research on selection of mollusk species for food and shellfish gathering strategies throughout the Western and South Pacific and Island Southeast Asia has repeatedly produced results showing the importance of nerites in prehistoric subsistence (Szabó 2001; Szabó n.d.). It seems that no nerite species larger that 5 mm across was exempt from collection. This not only applies to coastal marine species, but also to freshwater ones. A recent analysis of shell material from a cave site in northern Palawan Island in the Philippines, where deposits span a period from 10,000 years ago to pre-colonial times, is dominated by *Vittina turrita* (Gmelin, 1791), *Neritodryas dubia* (Gmelin, 1791), *Neripteron violacea* (Gmelin, 1791), and *Neritina pulligera* (Linnaeus, 1767), as well as lower frequencies of other species of freshwater and mangrove-associated nerites (Szabó *et al.*, in press).

It seems certain that early man in Indonesia was harvesting *Nerita textilis* as a source of protein and possibly for decoration. But was this predation enough to drive the species to the brink of extinction? Probably not. Keough *et al.* (1991) studied the effects of human collecting on several species of intertidal mollusks, including *Nerita atramentosa* Reeve, 1855. At a series of sites along a 10 km stretch of coastline on Port Phillip Bay, Victoria, Australia, they took random samples of various mollusks. Half of the sites were open to human activity (although nominally "protected"), while the remaining sites were in an area designated a "Fauna and Flora Reserve" and highly restricted to public access. They found that even though the Shellfish Protection Act of the early 1980s prohibits intertidal collecting, approximately 25% of the people were observed actively collecting (most for bait and some for food). The researchers found the numbers of most species were fairly constant between the open and the protected areas, with a single exception. There were over twice the number of *Nerita atramentosa* in the protected areas as there were in the open access areas. They also found that the animals in the protected areas were on average larger than those in the open access areas. Similarly, in an extensive study of nerite predation in the Panamanian *Nerita scabricosta* Lamarck, 1822, Garrity & Levings (1981) found the majority of 1,095 snails sampled were no larger than 15 mm, with the largest encountered (a single individual) measuring 30 mm - this in a species that commonly exceeds 40 mm. The snail is collected for food by the local populace and the larger snails are obviously the better targets. So while predation by man has a measurable impact upon nerite species, it is probably not sufficient to explain the absence of *Nerita textilis* in strata younger than 10,000-years.

Katherine Szabó offered a possible explanation. During the last Ice Age (Pleistocene), when sea levels were much lower, many of the western Indonesian Islands were joined to the Asian mainland and some eastern Indonesian ones, along with the island of New Guinea, were joined to Australia. These large landmasses are respectively known as Sunda and Sahul. It is this ancient geological pattern that is largely responsible for the biogeographic 'line' that separates Asian and Australian terrestrial faunas and floras first noted by Alfred Russel Wallace, and now termed

Fig. 3. Top row, left & middle: typical *Nerita textilis* from Mozambique, right: specimen from Natal with sharp-keeled spiral cords. Lower row: melanistic variations from Oman with flattened spiral cords.

'Wallace's Line.' Between these two landmasses stand islands that were never connected to either landmass. This zone is termed 'Wallacea' and includes Timor, Sulawesi, and most of the Moluccan Islands. The marine areas around these islands are the major 'through flow area' where the warmer Pacific Ocean flows into the Indian Ocean. With rising sea levels associated with the end of the last Ice Age around 12-10,000 years ago, there were major changes in the strength and path of currents operating in this area as new 'gaps' opened between islands that had previously been joined. This westward current may have carried *Nerita textilis* away from Indonesia towards Africa.

Fig. 4. World record size (60 mm) *Nerita textils* from South Africa.

As in other species of *Nerita*, the eggs of *Nerita textilis* hatch into planktotrophic veligers, a free-floating larval stage. The newly emergent current patterns may mean most of the veligers were swept westward, away from Indonesia. Such an event coupled with human predation might have spelled the eventual demise of *Nerita textilis* in Indonesian waters. If so, there existed the possibility of a remnant population that may have been larger when early authors described the species with a range that included Indonesia and the Philippines but kept shrinking. Before we complete the story of the range of *Nerita textilis*, it would be best to examine the species and its natural history.

Nerita (*Melanerita*) *textilis* Gmelin, 1791 (figs. 1 - 4,7)

Described by Gmelin in *Systema Naturae* I, pt. 6, p. 3683, no. 53, 1791. Locality: given by Gmelin as, "Habitat rarissima..." The locality was listed as the Philippine Islands by Chemnitz, 1781, in the original description of *Nerita plexa* (ruled non-binominal by International Commission on Zoological Nomenclature (ICZN)).

ETYMOLOGY: The name *textilis* is the Latin *textilis* for woven or braided, an obvious reference to the rope-like appearance of the spiral cords on many specimens.

SYNONYMS: *Nerita chlorostoma* Lamarck, 1816; *Nerita costata* Schumacher, 1817; *Nerita plexa* Dillwyn, 1817 (based on Chemnitz, 1781 - non-binomial); *Nerita exuvia* Lamarck, 1822 (non Linnaeus, 1758); *Nerita haustrum* Reeve, 1855* (the black form of *Nerita textilis*).

COMMON NAME: Textile nerite. The Japanese name is *kurofu-amaobune*.

This is a solid, heavy shell with a moderately flared and scalloped-edged lip. The spire is flat and usually eroded and there are typically 12 to 18 prominent rounded spiral cords with narrow interstices and a pattern of smaller spiral cords alternating irregularly with the larger spiral cords. Prominent axial growth striae are set apart by swollen axial ridges that give the shell a characteristic rough look and feel. Specimens occasionally occur with narrow sharp-keeled spiral ridges and little evidence of axial growth striae. Melanistic specimens from Oman and the Seychelles have flattened spiral ridges. Older specimens are sometimes so eroded that they lack any indication of spiral cords. The outer portion of the aperture is ivory white, but deeper within, the exterior color pattern shows through. The parietal shelf is white with light to dark yellow tinting. There is well-developed crenulation inside the outer lip, terminating with two larger teeth on the upper (spire) side. The parietal shelf is concave and pustulose, being almost covered with small granules. There is a well-developed collar and strong folding at the base or whorl edge of the parietal shelf. The columella has two (rarely one) centered teeth in a slight depression and a large indistinct square tooth on the upper (spire) end. There is no periostracum. Colors are typically white with black rectangular markings on the spiral ridges. There is, however, a form found in Oman and the Seychelles with flat spiral ridges, little evidence of axial growth striae, and a color pattern of black with only occasional white markings. The exterior of the operculum is slate gray to black with a light gray to white nucleus, a tan apophysis, and brown interior side. It is densely pustulose with small granules. The apophysis is strong, broad, flared, longitudinally corded, and swept back at 45°. The operculum has a well-developed nuclear tooth or pseudo-apophysis with concentric ridges, a strong medial tooth, and a slight lateral tooth. The typical size for *Nerita textilis* is 30+ mm, but this species is the largest living nerite with a specimen originally collected by COA member Phyllis Diegel and now in the senior author's collection recorded at 60+ mm (Fig. 4)!

This is a relatively well-known species but there has been some confusion over the name. It was first described as *Nerita plexa* Chemnitz, 1781. But, the ICZN ruled all of the names by Chemnitz, except *Conus gloriamaris* Chemnitz, 1777, as non-binominal and invalid (Melville and Smith, 1987). The next time the name *plexa* was used to describe this species was by Dillwyn in 1817. With Chemnitz's work ruled invalid, this would have become the first valid use of the name. In the interim, however, Gmelin described the species as *Nerita textilis* in 1791. Thus making Dillwyn's name a junior synonym of Gmelin's *Nerita textilis*. Understanding of the species in both early and recent literature is very good (discounting the name problem). Reeve (1856), Martens (1889), G.B. Sowerby II (1887), and Tryon (1888) list this species as

*Tryon (1888) and Dekker (2000) consider *Nerita haustrum* a synonym of *Nerita yoldi* Récluz, 1841 with the locality data of the Red Sea for the syntypes in the British Museum in error. But it is more likely that the data slips are correct in regards to locality and that this is the black form of *Nerita textilis*, a supposition supported by Reeve's illustrations.

Fig. 5. Rocky outcrops on an Indonesian beach, perfect habitat for *Nerita textilis*. Photo courtesy of Chan Sow-Yan.

Fig. 6. *Neritia textilis* range map. The species does not appear to occur north of the Strait of Hormuz into the Arabian Gulf or past Eritrea into the Red Sea.

Nerita plexa but provide solid descriptions and good illustrations. Recent literature, including Abbott & Dance (1981), Kaicher (1987), Bosch *et al.* (1995), Dekker (2000), and Krijnen *et al.* (2001) have the correct name and excellent photographs. The exceptions include a couple of Internet web pages that continue to use the name *Nerita plexa*, often accompanied by a photograph of a pale and faded *Nerita exuvia* Linnaeus, 1758 (http://www.gastropods.com/7/Shell_8657.html; http://www.chez.com/malacos/htm/E30.HTM).

This is strictly a marine species found exposed on intertidal rocks in groupings of numerous individuals that feed at night during low tide. Studies have shown the groupings of individuals common in this species provide mutual protection from desiccation and overheating. An isolated individual will often not survive the heat of the day, while a group can slowly release stored water to serve as a communal evaporative cooler. Those snails in wave-splashed areas can be cooled and hydrated by wave action. Of course, not all resting spots will be equally cooled by wave action. Often groups of nerites will be too high on an exposed rock to be regularly cooled by waves. In this case the animals are usually grouped together for communal protection. Such clustering behavior seems to be fairly common and has been described in *Nerita japonica* Dunker, 1859, by Suzuki (1935); *Nerita atramentosa* by Dr Patty Jansen (personal conversation, 2001); *Nerita scabricosta* by Garrity & Levings (1981); and *Nerita textilis* by Vannini & Chelazzi (1978). Marine neritid species are typically thick shelled and globose, both to hold the maximum amount of water and to provide structural protection from external heating and desiccation. When the animal closes up in preparation for exposure on the rock face, it forms a watertight seal with the operculum seated behind the apertural ridge. Experimental removal of this ridge in intertidal dwelling nerites resulted in a significant increase in the rate of water loss (O'Mahoney & Gainey, 1982). The water stored within the shell is slowly released as necessary around the periphery of the aperture to provide evaporative cooling for both the individual and its neighbors. A clustered group of shells will survive the day on a hot, sun-baked rock, while a single individual, if isolated from the group, will often succumb to these extreme conditions. Apparently it is the heat rather than loss of water that presents the greatest danger. Garrity & Levings (1981) tested the cooling capabilities of *Nerita scabricosta* in clusters and as isolated individuals and found the temperature of the snail was less than 1°C cooler than the temperature of the substrate in exposed, isolated individuals. Clusters also maintained only a 1°C difference between the substrate and the animal's internal temperature, but the substrate under the cluster was almost 5°C cooler than the substrate under individual snails. Thus, clustered nerites enjoyed an environment almost 6°C cooler than the surrounding exposed surface.

RANGE EXTENSION

The range for *Nerita textilis* was most recently listed by Dekker (2000:46) as "...South Africa (East London) to southern Arabia and eastwards to Pakistan." Subba Rao (1980) states that records from the east coast of India cited by Ray (1948 – not seen) are in error and the species is limited to the west coast of India. Other localities listed in the literature such as: Ambon (Lichtenstein, 1794, as translated by Geiger, 2003), Philippines (Reeve, 1855), and the Nicobar Islands (Chemnitz, 1781) were considered suspect and well outside the range of this species by modern authors (Abbott & Dance, 1981; Kaicher 1987; Dekker, 2000; Krijnen *et al.*, 2001). But in fact, an isolated remnant population of *Nerita textilis* has been reliably reported from Indonesia. After the email discussions about fossil *Nerita textilis* in Indonesia were posted, two collectors responded with accounts of collecting this species at both Maluku Island and south Flores Island in 1996-7. (*Nerita textilis* thread, http://www.molluscan.com/forum/cgi-bin/dcforum/dcboard.cgi). They were in isolated pockets near large rocks and after several trips, only five specimens were found (fig. 7).

Fig. 7. *Nerita textilis* (no size indicated) collected live on south Flores Island, representing a significant range extension to Indonesia. Photo courtesy of Chan Sow-Yan.

Thus it seems *Nerita textilis* once had a range from Africa to Indonesia and possibly the Philippines (fig. 6). Climate changes linked with changing sea levels and current patterns, and possibly predation pressure from early humans, are most likely responsible for the almost complete disappearance of this species from the eastern portion of its original range.

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A Bit of History: COA 20 Years Ago

Conchologists of America Bulletin, March 1984, Vol 12, no 1.

The picture above is of the Don CeSar Beach Resort in St. Petersburg, Florida - the site of the COA convention for 1984. This hotel is across the bay from Tampa, the site of the upcoming 2004 convention. The special room rate for the convention was $53 plus tax, making today's room rate (considering 20 years of inflation) seem very reasonable. Programs for the convention included door prizes, shell talks, and a get acquainted party at the Science Center of Pinellas County. Transportation to the party was via carpooling.

The magazine, or bulletin as it was known, had 16 pages, 13 advertisers (6 of whom are still with us), and was, of course, black and white. Articles included "Shelling in and Around St. Petersburg, Florida, Part II" by Jane Colburn, "Kwajalein's Coral Pinnacles" by Jeanette Hammon, and "Tiny Philippine *Favartias*" by C. Glass and R. Foster (who also penned three other articles for this issue).

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Jordan Star's Web Picks

☺ = poor, ☺☺ = fair, ☺☺☺ = good, ☺☺☺☺ = excellent, ☺☺☺☺☺ = outstanding

This first site is a revisit, updated and improved.

☺☺☺☺☺ Should be more than 5 stars. Jacksonville Shell Club Home Page, http://www.jaxshells.org/. An excellent site for Florida shells and shelling with great information and many pictures. Fast-loading pages make it a pleasure to work with. If you want to know more about shells, especially FL shells, VISIT! If going to FL, a must-see site.

Now on with new sites. No particular order. Many sites provide links as jumping-off points to other sites.

☺ ☺ ☺ ☺ ☺ Man and Molluscs, http://www.manandmollusc.net/. The number of links can be confusing for the casual surfer, but if you have a particular goal in mind this is a VERY useful site. I found two non-functioning links, there maybe a few more. Lots of information for kids and teachers. Worth a visit. A site map and search function are nice features. Site is under construction, so not everything works.

☺☺☺☺ Mactan Shells, http://www.mactanshells.com/. A commercial site from the Philippines. Craft items and specimen shells available and pictures are provided.

☺☺☺☺☺ University of Michigan, Museum of Zoology, Mollusk Division, http://www.ummz.lsa.umich.edu/mollusks/index.html. Includes links to marine mollusk, freshwater mollusk, terrestrial mollusk, and non-mollusk sites. Information on species native to the Michigan area, with checklists of insects and other creatures, museum links, literature links, etc.

☺☺☺ Australian Shells, http://www.capricornica.com/Aust_shells/index.htm. Pictures lower resolution than desired. A simple guide in my opinion. Frames-enabled browser required, what is that? Left side of screen for family links, right side for species links. Three frames or boxes for information. Mac users, uncertain.

Links good as of 3/7/04

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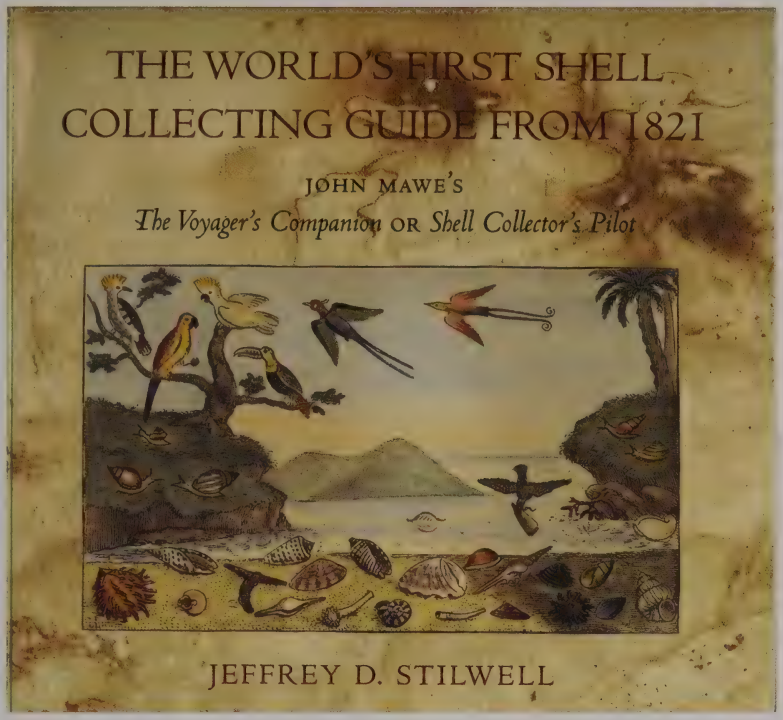

Reviewed by Thomas E. Eichhorst

John Mawe (1766 – 1829) was born of middle class parents in England. After a 15-plus-year stint in the British Merchant Navy, begun when he was 11 or 12, he went to work selling objects d'art made of marble. He married the boss's daughter, opened a new shop in London, and expanded the operation to include various natural history specimens such as gems, minerals, and seashells. This was a lucrative business and Mawe had time to write about his collecting excursions to ports around the world. He authored several books on conchology as well as mineralogy.

The book provided as a facsimile by Dr. Stilwell was one of Mawe's lesser-known works, but is arguably the first shell-collecting guide ever published. It is a small, 56-page work that is part travelogue of collecting spots around the world and part instruction book that describes how to properly clean, store, and ship seashells and other items of interest to naturalists (birds, reptiles, mammals, minerals, etc.). While this small book is certainly interesting and informative, the value of Stilwell's work lies in his supporting material.

If this were just a reprint of Mawe's work it would be of interest to only a limited audience. There are no new species described, the collecting and preservation instructions are found in other books, and the collecting tips are hardly revelatory. But Dr. Stilwell constructs a picture of the world of conchology 200 years ago that is both rich in texture and concise. He ends his book with the facsimile of Mawe's work and by the time the reader has gotten that far, he or she has been exposed to an abbreviated history of early shell collecting and some of the notable figures of that time.

The first chapter builds the background and circumstances surrounding the *Shell Collector's Pilot.* This includes an earlier (1804) and extremely rare version of only 11 pages (also included as a facsimile). Only a single copy of this first effort is known today. It reads a bit like an advertisement for Mawe's shop and indeed ends with an offer to buy natural history collections. This first edition has the cumbersome title of: *A Short Treatise Addressed to Gentlemen visiting the South Seas, and all Foreign Countries; more particularly to Commanders, &c. of Ships, and Gentlemen Residing on Shore, with a view to encourage the collecting of Natural History.* Of note here is that this edition is printed with the long s (the eighteenth century form that looked like a lower case *f* with the crossbar on only the left side) and has every noun capitalized. Both the long s and the capitalized nouns were holdovers from the 18th century and were dropped by the time the 1821 edition was printed.

The second chapter is a wonderfully concise history of early shell collecting. From prehistoric shell middens, to the Roman Emperor Caligula, to the collector cabinets of the 1800s, Stilwell presents the history of early shell collecting and includes an introduction to many notable figures of that era. The first chapter provides the background and the second chapter provides the environment, both necessary for the third chapter on Mawe's life.

After reviewing what is known about this rather intriguing man, the author provides the facsimile of the 1804 edition and closes with the facsimile of the 1821 edition. By the time you read the 1821 edition you can almost hear John Mawe as he describes collecting along the Spanish Main (North America) or explains how to rinse a shell in water and preserve the periostracum.

Dr. Stilwell's book is a delight to read and worthy of inclusion in any shell collector's library. Published by the W.A. Museum in August 2003, ISBN 1920843043, retail AU$39.95. Distributed in the U.S. and Canada by:

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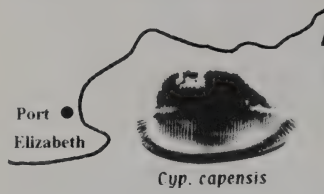

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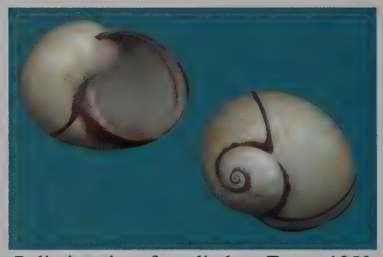
The Genus *Polymita*: Bright Colors From Cuba

by Tom Eichhorst

Polymita brocheri cuestana Torre, 1950, 20 mm, Baracoa, Oriente Prov., Cuba.

Polymita brocheri ovandoi Torre, 1950, 24 mm, Baracoa, Oriente Prov., Cuba.



Polimita picta fuscolimbata Torre, 1950, 30 mm, Baracoa, Oriente Prov., Cuba.

Polymita picta fuscolimbata Torre, 1950, (form *fuscofasciata*) 30 mm, n. of Baracoa, Oriente Prov., Cuba.

Polymita picta fuscolimbata Torre, 1950, (form *pseudomuscata*), 22 mm, Jauco, Oriente Prov., Cuba.

Polymita picta fuscolimbata Torre, 1950, (form *pseudonigrolimbata*), 30 mm, Calatica, Oriente Prov., Cuba.

Polymita picta fuscolimbata Torre, 1950, 32 mm, n. of Baracoa, Oriente Prov., Cuba.

Polymita picta iolimbata Torre, 1950, 30 mm, Baracoa, Oriente Prov., Cuba.

Polymita picta iolimbata Torre, 1950, (form *iofasciata*), 26 mm, Caleta, Oriente Prov., Cuba.

Polymita muscarum muscarum (Lea, 1834), 20 mm, Holguin, Oriente Prov., Cuba.

Polymita muscarum splendida Torre, 1950, 21 mm, Holguin, Oriente Prov., Cuba.

Polymita muscarum (Lea, 1834) (form *tanamensis*), 20 mm, Holguin, Oriente Prov., Cuba.

The land snail genus *Polymita* is only found on the eastern tip of Cuba in the Province of Oriente. *Polymita* are hermaphroditic, that is each individual has both male and female sex organs. Mating takes place in July and August. The eggs are laid in September and hatch during the first spring rains. Adults aestivate during the winter and during prolonged dry spells. *Polymita* feed on the algae, mold, fungus, and lichens found on shrubs and trees. They do not eat the leaves and are valued in coffee plantations where they help maintain healthy coffee plants. The varieties of colors can be confusing to the collector trying to catalog these colorful shells. One useful key is the color and shape of the band along the columella in the *Polymita picta* subspecies. The information and identification presented here are based on The *Polymita* Home Page by Emilio Jorge Power, on the web at http://www.geocities.com/Eureka/Gold/9440/polymita/polyhompg.html.

Polymita picta nigrolimbata Torre, 1950, (form *nigrofasciata*), 26 mm, Baracoa, Oriente Prov., Cuba.

Polymita picta nigrolimbata Torre, 1950, 26 mm, Jauco, Oriente Prov., Cuba.

Polymita picta picta (Born, 1778), (form *multifasciata*), 26 mm, Jauco, Oriente Prov., Cuba.

Polymita picta picta (Born, 1778), (form *obscurata*), 26 mm, Baracoa, Oriente Prov., Cuba.

Polymita picta picta (Born, 1778), 30 mm, Cajobabo, Oriente Prov., Cuba.

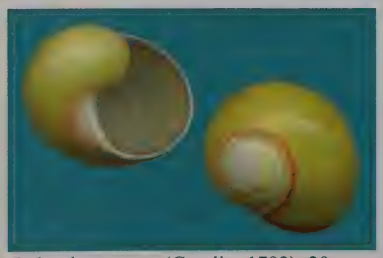
Polymita picta roseolimbata Torre, 1950, 23 mm, Jauco, Oriente Prov., Cuba.

Polymita picta roseolimbata Torre, 1950, 27 mm, Jauco, Oriente Prov., Cuba.

Polymita sulphurosa flammulata Torre, 1950, (form *viridis*) 19 mm, Canonova, Oriente Prov., Cuba.

Polymita sulphurosa flammulata Torre, 1950, (form *violacea*) 20 mm, Canonova, Oriente Prov., Cuba.

Polymita venusta (Gmelin, 1792), (form *olivacea*) 18 mm, Holguin, Oriente Prov., Cuba.



Polymita venusta (Gmelin, 1792), 20 mm, Tagabu, Oriente Prov., Cuba.

Polymita versicolor (Born, 1778), 23 mm, Playa Blanca, Oriente Prov., Cuba.

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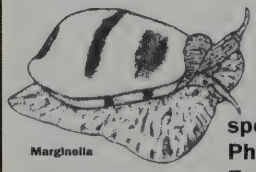

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SCUM VIII: *Southern California Unified Malacologists*

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Thirty-six professional, amateur, and student malacologists and paleontologists attended the 8th annual meeting of Southern California Unified Malacologists (SCUM) at the Cabrillo Marine Aquarium, San Pedro, California, on Saturday, January 24, 2004. This informal group continues to gather to keep colleagues informed of research activities and opportunities. There are no dues, publications, or officers. SCUM and other informal groups including BAM (Bay Area Malacologists) and MAM (Mid-Atlantic Malacologists) are an important link between collectors (both casual and advanced) and professional malacologists, biologists, and paleontologists. This is readily evident when over 50% of the SCUM VIII attendees would be considered non-professional.

SCUM VIII was hosted by Ron Velarde who welcomed the group and updated everyone on the progress towards the completion of a new building for the City of San Diego Marine Biology lab, which is where the meeting WAS to be held. Nevertheless, SCUM IX will be hosted in the new facility by Ron's colleague Kelvin Barwick in January of 2005. Ron also shared an article from the June 24th 2003, San Diego Tribune entitled *Under their spell* which highlighted unusual acronyms including SCUM. Aquarium director Suzanne Lawrenze-Miller (a former malacologist) presented architectural plans for expansion of the facility. SCUM attendees were then given the opportunity to briefly present current mollusk-related research/activities. In-depth talks were presented by Doug Eernisse, Mary Jane Adams, and Dave Jacobs. Attendees toured the aquarium following the meeting.

SCUM VIII attendees and their current activities:

Mary Jane Adams (Arcadia, CA): Diver and underwater photographer, recently participated in a National Geographic expedition to the Phoenix Islands, Kiribati (see *National Geographic*, February 2004 issue for details).
Yvonne Albi (Pacific Conch. Club): Continues her research on Late Cretaceous rudist bivalves and Tertiary echinoderms.
Jerry Allen (San Diego, CA): Underwater photographer who documents marine life, especially the nudibranchs.
Kelvin Barwick (City of San Diego Marine Biology Lab): Mollusk and polychaete taxonomist. Currently investigating a new species of the opisthobranch *Akera* from southern California.
George Davis (Nat. Hist. Mus. L.A. Co.): Continues as Collection Manager of Crustacea Section and manages taxonomic database with 27,000+ entries. Recently published *An updated classification of the Recent Crustacea* with Joel Martin also of LACM Crustacea.
Matt Doi (Pacific Conch. Club): Collector of fossil and Recent shells.
Doug Eernisse (Calif. St. Univ., Fullerton): Continues studies in chiton phylogeny and population dynamics. Recently delved into fossil chitons and co-authored the genus *Echinochiton* with Pojeta, Hoare, & Henderson in *Journal of Paleontology*. Hopes to participate in recreation of the Ricketts/Steinbeck expedition to the Sea of Cortez (Gulf of California).
Wes Farmer (San Diego, CA): Production of Torrey Pines State Park (San Diego Co., CA) CD ROM that features fossil and mineral outcrops.
Christine Fernandez (Univ. Calif. Santa Barbara): Student at UCSB.
Lance Gilbertson (Orange Coast College): Research of land snails of west Texas to southern California, especially the Helminthoglyptidae.
Lindsey Groves (Nat. Hist. Mus. L.A. Co.): Fossil Cypraeidae research, review of Caribbean and adjacent areas genus *Muracypraea* and four new species of *Eocypraea* from California, Washington, and Baja California Sur, Mexico. Review of fossil taxa of W.M. Gabb, the cypraeiform gastropods of Crawford Cate, and a companion volume to Keen & Bentson (1944) *Check list of California Tertiary marine Mollusca.*
Carole Hertz (San Diego Shell Club): Editor of the San Diego Shell Club publication, *The Festivus* since 1970. Displayed recent *Festivus* supplements for sale.
Jules Hertz (San Diego Shell Club): Asst. ed. & business manager of *The Festivus.* Edited upcoming book on southern Australian Cypraeidae.

David Jacobs (Univ. Calif. L.A.): Studies molecular development in gastropods and geographic structure of mollusks of the central California coast, especially the estuarine taxa *Cerithidea* and *Transenella*. The molecular data indicate Miocene relict upwelling.
Seth Jones (San Diego, CA): Interest in all marine invertebrates.
Kathy Kalohi (Pacific Conch. Club): Amateur collector and wreck diving enthusiast.
George Kennedy (Brian F. Smith & Assoc., Poway, CA): Site inspection projects in San Diego Co., especially in Pleistocene and Eocene strata.
Pat LaFollette (Nat. Hist. Mus. L.A. Co., Res. Assoc.): Studies Pyramidellidae in the northeast Pacific, especially the genus *Odostomia*.
Suzanne Lawrenz-Miller (Director, Cabrillo Aquqrium): Highlighted current expansion project and future programs of the aquarium.
Phil Liff-Grieff (Pacific Conch. Club): Collector of land snails and studies their systematics and biogeography.
Jim McLean (Nat. Hist. Mus. L.A. Co.): Continues on 2 volume book on the shelled gastropods of the northeast Pacific that will feature 500+ undescribed species. Recently completed text and plates revision of *Intertidal invertebrates of the central California coast* (*Light's Manual*).
Mike Miller (San Diego, CA): Manages *Slug Site* a web site devoted to opisthobranch mollusks (see http://slugsite.tierranet.com/).
Dave Mulliner (San Diego Shell Club): Photographer for *The Festivus*.
Chuck Powell (U.S. Geol. Survey): Researching Miocene/Pliocene Wilson Grove Formation in Sonoma Co., CA
Bret Raines (Victorville, CA): Through his research on the mollusks of Easter Island, Bret has doubled the number of species reported by Rehder (1980). His Pectinidae monograph should be published later this year.
Scott Rugh (San Diego Nat. Hist. Mus.): Collection Manager, Invertebrate Paleontology; studies fossil and Recent mollusks; needs volunteers.
Kathy Rutkas (Pacific Conch. Club): Retired amateur collector.
Terry Rutkas (Pacific Conch. Club): Amateur collector , produced photo essays on various mollusk groups for *Las Conchas* (newsletter of the Pacific Conchological Club).
Nancy & Bill Schneider (San Diego Shell Club): Collectors of Pliocene and Pleistocene mollusks from the Mulege Formation, Baja California Sur, Mexico, for exhibits in the Mulege Museum.
Shelly Smith (Los Angeles, CA): High School teacher.
Mary Stecheson (Nat. Hist. Mus. L.A. Co.): Manages the Invertebrate Paleontology Section, Pleistocene database on a National Science Foundation grant. Completing her MS thesis on Late Cretaceous mollusk assemblages from the Chatsworth Formation of southern California at Calif. St. Univ., Northridge.
Ángel Valdés (Nat. Hist. Mus. L.A. Co.): Studies opisthobranch mollusks, especially the nudibranchs and their biogeography and phylogenetics.
Ron Velarde (City of San Diego Marine Biology lab): Participates in U.S./Mexican border to Pt. Conception, Santa Barbara Co., CA, benthic sampling program from 500 to 1000 m depth in order to compare results with previous surveys.
Mike Vendrasco (Univ. Calif. L.A.): Studies evolution of chitons.
Danny Yoshimoto (Eureka, CA): Currently participating in Nature Discovery Volunteers, an educational group in Humboldt Co., CA.

Figure caption (photo courtesy of George Davis)
Left to Right: **Jerry Allen, Christine Fernandez, Mike Miller, Dave Mulliner, Scott Rugh, Terry Rutkas, Suzanne Lawrenz-Miller, Matt Doi, Bill Schneider, Shelly Smith, Kathy Rutkas, Dan Yoshimoto, Lance Gilbertson, Nancy Schneider, Seth Jones, Phill Liff-Grieff, Chuck Powell, Dave Jacobs, Pat LaFollette, Bret Raines, Doug Eernisse, Kathy Kalohi, Jules Hertz, Lindsey Groves, Mary Jane Adams, Mike Vendrasco, Carole Hertz, Ángel Valdés, Wes Farmer, Jim McLean, Ron Velarde, Kelvin Barwick, George Kennedy,** and **Mary Stecheson**. Front Row: **Yvonne Albi** and **George Davis**.

COA CONVENTION 2004 GRAND HYATT TAMPA BAY

26 June – 3 July

The 2004 COA Convention is rapidly approaching. You should have received your convention packet with both convention and hotel registration forms in the last issue. This year's convention includes dive trips, fossil trips, low tide collecting, a dinner cruise, a banquet with entertainment, and visits to local attractions like Tarpon Springs, Pinewood Cultural Park, and the Florida Aquarium. There are numerous silent auctions planned as well as the main oral auction, raffles, top-notch speakers and interesting shell programs, and of course, the Bourse. Shells from around the world will be on display and for sale in a 10,000-foot exhibition center. You will see shells that sell for pennies as well as some that require a second home mortgage! There will be thousands of shells, hundreds of fellow shell collectors, and a few supportive but non-shell collecting spouses, all under one roof. Each year it seems there is a shell that creates a buzz – what will it be this year? Will folks get excited over a deep-water thermal vent shell or a newly discovered *Cypraea*? You have to attend to find out!

Guests will stay at the beautiful and luxurious Tampa Bay Grand Hyatt where they will enjoy first class accommodations and ocean sunset views. This promises to be another premiere convention. Don't miss out! This is the largest event of its kind in the world. Shell collectors attending for the first time are typically awed, maybe over-whelmed, but always determined to come back next year. So make your plans and send in that registration form. This is the year's must-attend event. See you there!

COA 2004 - Tampa, FL

My Favorite Shell

Aporrhais uttingeriana var. *peraraneosa* (Sacco, 1893)

Ulrich Wieneke/Germany

biermann.wieneke@t-online.de

To find exceptional shells is not easy if you are looking for fossil gastropods. There are not many dealers that sell rare gastropod fossils and the locations where you can find these fossils are usually only accessible for a short time. Moreover, good specimens are very rare and are the exception even in local collections.

Some years ago I saw a very interesting specimen at the mineral and fossil show of Ste. Marie-aux-Mines, France. It looked like an *Aporrhais uttingeriana* but with much longer spines. It was exhibited by an Italian museum and was not for sale. Unfortunately, no information about the specimen was available except that it came from the Italian Pliocene and, again unfortunately, I didn't have a camera with me. So I had only my memory of this fascinating item. But my interest was aroused.

A year later I was offered a gastropod named *Aporrhais uttingeriana peraraneosa.* This came quite close to my memory of the Italian *A. uttingeriana*, but was considerably smaller and after examination turned out to be a fake. The spines had been lengthened to double the original length. I came across this kind of fake several times afterwards.

At least I knew the name now, but I was still searching for an actual specimen. I soon found that Sacco described a form like this in 1893 as *Chenopus uttingerianus* var. *peraraneosa.* Sacco's drawing shows a specimen with spines longer than the common *Aporrhais uttingeriana* but it wasn't as impressive as the specimen I seemed to remember. Had my memory gone wrong?

Then a Portuguese dealer offered me an *Aporrhais uttingeriana* that should measure 98 mm, which is unusually large. I bought it. This was it, the *Aporrhais uttingeriana* var. *peraraneosa* as I remembered it and as can be seen in the photo. The fossil is from the lower Pliocene, Revignano (Asti), Italy, and is 93mm long (with spines). Finally I was able to confirm the name through an article written by Damarcko (1994), in which a specimen exactly corresponding to mine is shown. The differences in the lengths of spines between the description of Sacco and Damarcko is only due to different localities. My puzzle was solved. BUT, another specimen depicted by Damarcko has the ends of the spines curled back.

This looks even more unusual. Well, the hunting goes on…

Literature:

Damarco, P. (1994). "Alcuni esemplari eccezionali di Aporrhaidae Fossili del Pliocene Piemontese [Some exceptional fossil Aporrhaidae specimens of the Piedmontese]." World Shells 9: 28-30.

Sacco, F. (1893). "I molluschi dei terreni terziarii del Piemonte e della Liguria". Parte XIV. (Strombidae, Terebellidae, Chenopidae ed Haliidae), Clausen, Torino

Sacco, F. (1893). "Le variazioni dei molluschi." Boll. Soc. Mal. It. 18: 139-160, 1 Plate

***** Editor's note: the writer's site: http://www.aporrhais.de is definitely worth a visit.**

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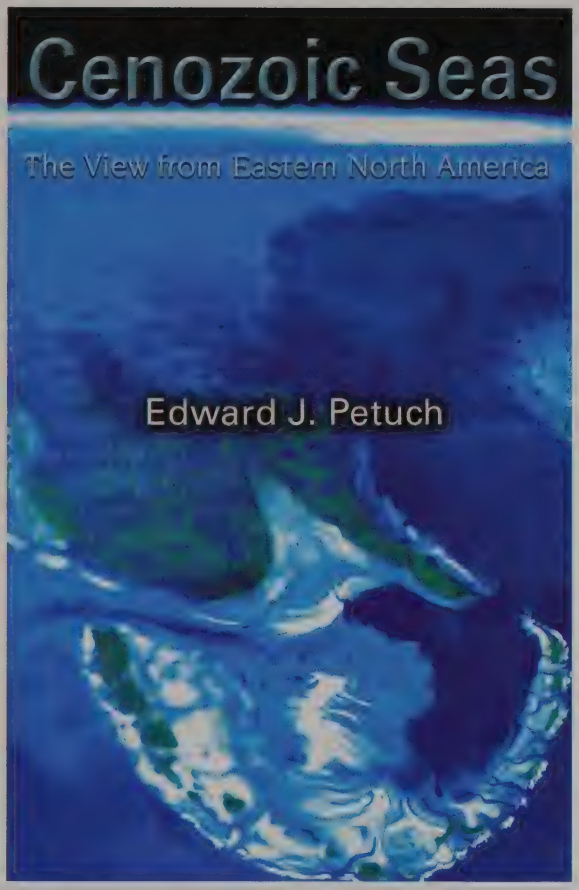


Cenozoic Seas - The View from Eastern North America By Edward J. Petuch

Review by Allen Aigen 02-22-04
serirach@juno.com

Ed Petuch's latest book will be welcomed by many loyal fossil collectors, is necessary for serious researchers dealing with Western Atlantic gastropod groups, and is of interest to students of evolution, ecology, stratigraphy and oceanography. This book has 97 plates of popular shells from Florida to Quebec covering the last 35 million years, plus four more of fossil to Recent gastropods from Venezuela and Panama. It will help collectors understand their shells as living organisms in communities as they evolved from the Oligocene to the Recent, responding to geographic and climate changes. It will also help collectors put their shells in a framework of time and space with 34 full-page paleogeographic maps, as well as two pages of correlation charts of rock/time units, with corresponding lists of formations.

The communities Petuch describes move in time and space as the geography and climate change, but Petuch mostly deals with coral reefs and associated carbonate environments, turtle grass beds in lagoons, and mangrove forests in estuaries. The same trophic (feeding type) groups characterize each of these communities, often in the same genera or families, but with different species or genera, respectively. This stability, within a constantly changing pattern of shells and environments known from scattered outcrops and scattered publications, is what Petuch has used to tie it all together as paleoceanography. The pattern, however, was derived for Florida and does not fit as well north of Florida.

The photography in this book is very good, with digital illustrations (by Mardie Drolshagen Banks) of more than 660 gastropods, including 62 cowries, 115 muricids, 51 cones, 55 busyconids, 24 volutes, 23 strombids and 19 olivids. The specimens are generally of the highest quality feasible. There are also pictures of associated bivalves, corals, crustaceans and petrified wood to help the reader understand the shells in context of their community. Seven pages of references facilitate further research.

In this work Petuch names, describes and pictures 36 new species or subspecies of gastropods (including 11 new cypraeids, 4 cones and 5 busyconids). There are also 15 new genera and subgenera described, including six of cypraeids, five of cones and 2 of busyconids. One new pectinid is described.

Petuch has brought together the very complex stratigraphy of the East Coast into one book, and arranged the many disparate formations into seven named geographical 'seas' and 37 'subseas', for which he gives the corresponding, existing formation names. Many of the names are new, some he has used before. Shells and their seas are summarized in context for northern South America and the Caribbean. This is a potentially useful way to understand the stratigraphy, but it is a radical change and one with no formal backing from the geologic community. Petuch would have been better off proposing this method in a professional journal before assuming that it would be accepted. Collectors should continue using formation names, and not substitute the subsea name on labels. Absolute ages are not used in this book, but standard age names are used and dates can be added.

The provinces and subprovinces that he designates for paleobiogeographical areas from Quebec to Argentina and Peru are also controversial. Oceanographers and paleoceanographers have many schemes for dividing the oceans and often disagree as to their utility. Petuch demonstrates a good grasp of many disparate facts, putting them together in a comprehensive way. He takes a "big picture" approach, but he is not supported by the detailed statistics expected for modern research. His maps are useful to understand different areas, but are not the last word.

Fossils (and a few Recent relicts) are pictured from Venezuela to Quebec with 63 plates from various locations in Florida (reflecting its size, complexity and time underwater), 17 from Maryland, 9 from North and South Carolina, 3 from Virginia, 4 plates of South and Central American shells and 2 from Quebec. There are also three plates with only one shell on each: two pectens and a nautiloid. After the first 6 plates (which are of index genera for entire provinces) he illustrates characteristic gastropods (and a few bivalves, petrified wood, crustaceans, and other fossils) for each community he describes (about 10 to 14 photos per plate.) Captions are conveniently on the same page as the photos. Many,

but not most, of the shells are pictured front and back. This arrangement fits the scheme presented for understanding the communities and changes in time and space, but it is hard on collectors. Taxa are not listed in the index (except the species/genus for which the community is named). There is no way to take an unknown cone, for example, and compare it to all the cones in the book without going through each plate. Formations are not listed in the index either, so even if you knew the formation a shell came from, you would still need to dig to find the corresponding plate. You will get a generally up-to-date name, author, date, and location and geologic formation where it was found, but no description of the shell (unless newly described) and no synonymy. Pictured specimens were generally not compared to the original types, so some of the names are questionable. The shells, which ultimately are the basis for this book, are not placed in a repository for further evaluation by others, unless newly named. Petuch's species names that have been previously placed in synonymy are used again without acknowledgement. Moreover, many of the cited authors are not listed in the references.

Although Petuch uses the term index species, he too often refers to rare forms with a very restricted distribution that do not fit the normal definition of index species, which should be relatively common, widespread and restricted in time. Charts of all the species Petuch mentions, showing all the subseas and communities in which it is found, would have been very useful. As it stands, it is not possible to use this as a reference to determine when or where a faunal collection or specimen comes from with any certainty.

Considering the breadth of coverage, the number of references cited is meager. For example, trophic groups have a large body of literature for Recent species. There may be nothing wrong with Petuch's assignments of feeding types to particular fossils, but you will need to take him on his word. The stratigraphy, which is neatly summed up, actually has many open questions and controversies that Petuch does not indicate. He oversimplifies far too much. For example, although he refers to Campbell, 1993, for the stratigraphy of Virginia, he actually uses the stratigraphy of Ward and Blackwelder, 1980, which Campbell specifically discounts in his monograph. Of the seven pages of references, two consist of Petuch's own previous publications. Because many of Petuch's previous works were privately published and not easily available, summarizing them is useful. There is, however, a relatively small amount of really new information in this book. It is written almost like a textbook, summarizing and reorganizing all that is known about the subject that fits within Petuch's scheme. As such, it is useful, and the addition of plates allows the non-specialist to better understand the ideas presented. However, anyone doing original research would prefer a truly comprehensive reference list, and will also fault Petuch for the lack of supporting documentation for the new material.

The new species (including three still living) are described in 26 pages at the end in a systematic index. Typically for Petuch, they are terse descriptions with little comparison to similar species and scant indication of the range of variation. The photographs, often just one reduced-size picture per species, are scattered amongst the other members of its community. This is legally adequate for valid new names, but both the malacological and paleontological communities prefer describing new species more fully and in a peer-reviewed journal. New species and genera are important enough not to be added as an appendix to a privately published book on paleoceanography.

There are only a few minor editing errors, such as two switched captions, an unidentified picture, and a misspelled author's name. But overall this book succeeds in its basic premise: to divide the east coast malacofaunas into communities, living in time-restricted subseas, basin-restricted seas, and overall provinces covering the last 35 million years. This book is apparently an attempt by Petuch to educate fossil collectors who have little scientific background. They will not, however, be able to understand the problems with the book. Collectors with a strong background will appreciate the pictures, and the newly named species cannot simply be ignored. Shell collectors should realize the limitations, however, before deciding to buy this expensive book.

Thanks to Andrew K. Rindsberg (Geologic Survey of Alabama) for editorial help, and to others who read this book review.

ISBN 0-8493-1632-4 . $189.95 308 pages, including 101 pages of plates, 33 pages of figures, seven pages of references and a four-page index. Pages are 6 ¾ inches by 10 inches, of high quality paper. The hardback cover is slick and has a computer-generated aerial image of southern Florida from about 5 million years ago. The book is well printed and edited by CRC Press, Boca Raton, Florida.

COA 2004 - Tampa

The Tampa skyline. Attractions in this area include: Busch Gardens Tampa Bay (among the nation's top four zoos), the water park Adventure Island, Lowry Park Zoo & Fun Forest at Lowry Park, Museum of Science and Industry (with IMAX theater), Florida Aquarium, Henry B. Plant Museum at the University of Tampa, Museum of Art and the Tampa Bay Performing Arts Center, Tampa Bay Downs and Greyhound Track, restaurants with Spanish, Southwestern, Italian, Oriental, and continental and seafood cuisines, and shopping at Old Hyde Park Village nestled in one of the city's oldest neighborhoods off Bayshore Blvd. or the Brandon shopping district & mall.

George Perry's molluscan taxa and notes on the editions of his *Conchology* of 1811

Zootaxa 377: 1-72 (*8 December 2003*) 1 plate; 331 references

by Richard E. Petit

Review by Thomas E. Eichhorst

George Perry lived in England in the 1700 and 1800s and authored two natural history works, *Arcana; or the Museum of Natural History: containing the most recent discovered objects* (1810-1811) and *Conchology, or the natural history of shells; containing a new arrangement of the genera and species* (1811). And that is about all that is known about him. We do not know his date of birth or when he died, but his works live on through some very well-known mollusks: *Biplex perca* (Perry, 1811); *Cabestana spengleri* (Perry, 1811); *Lyncina camelopardalis* Perry, 1811; *Lambis digitata* Perry, 1811; *Leporicypraea valentia* (Perry, 1811); *Homalocantha anatomica* (Perry, 1811); to mention just a few. These taxa were presented in Perry's *Conchology* and it is this work (to a lesser extent the *Arcana*) and the author that are the subjects of Richard Petit's manuscript.

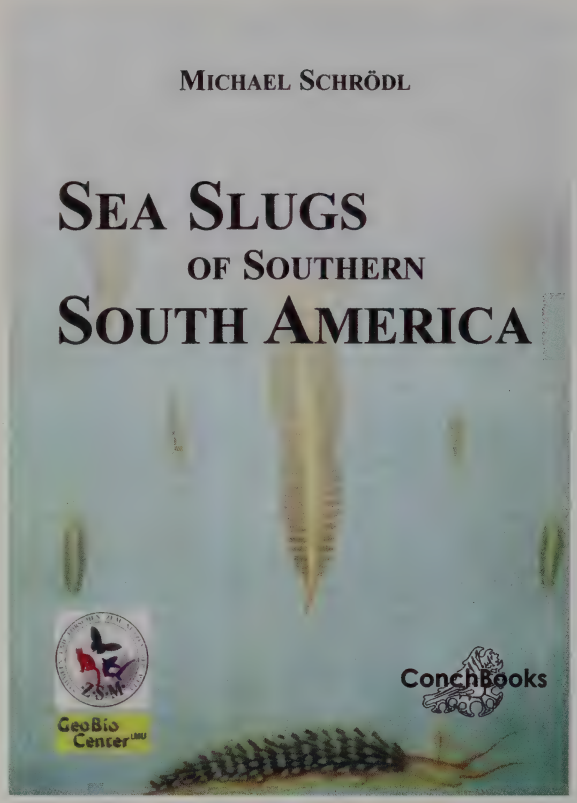
I have to say up front that I enjoyed reading, and then re-reading, this work as much or more than I have any shell related work. The work is basically in two parts, a discussion of Perry and his writings and an investigation of the taxonomy of Perry's works.

The first section or the story of Perry and his writing should appeal to anyone interested in shells and shell collecting. This part is almost like a great suspense novel with the early rejection of Perry's works caused by the "battle" at the time between the England-based Linnaean supporters and the French Lamarckian supporters. Perry's admiration of Lamarck's proposed genera (many now in use) was sufficient reason to have his writings ignored by English scientists of the time. Later he ended up on opposite sides against such well-known personages in conchology as G.B. Sowerby I and Lovell Reeve. Both attacked Perry's writings on various grounds, shown to be rather spurious by Petit. It is in this part of Perry's story that the reader gets a bit of color and life to go with these early icons of conchology who are too often viewed as only a name behind a shell. These early troubles actually followed Perry's work into the 21st century and it is finally in Petit's manuscript that much of this is resolved.

In the second portion of the manuscript, Petit provides a scientific evaluation of Perry's taxa, with the current status and synonymy, type species selection where needed, as well as a discussion of related facts, for each of Perry's names. Six species are declared *nomina oblita*. That is, even though they are senior synonyms or homonyms of names in use today, the more well-known names (such as *Murex brevifrons* Lamarck, 1822) are preserved because the Perry name (*Triplex cornuta* Perry, 1811), even though senior, has not been used in recent literature while the junior name has been used by at least 25 authors in the last 50 years. Petit also finds three Perry species that are senior synonyms of names presently in use that cannot be declared *nomina oblita*. Thus the very popular muricid, *Chicoreus palmarosae* (Lamarck, 1822) should properly be *Triplex rosaria* Perry, 1811. I will leave the other names as well as a plethora of in-depth material for the reader to discover. Petit provides both rationale and proof for his taxonomic assertions for over 350 species-group taxa by Perry.

Anyone with an interest in the history behind our hobby/avocation/business/pursuit will find Petit's work both valuable and interesting. This manuscript is available free of charge as a downloadable pdf. text on the Internet site of Zootaxa at: http://www.mapress.com/zootaxa/2003f/zt00377.pdf.

Below are two examples of well-known shells named by Perry. The *Homalocantha anatomica* (Perry, 1811) on the left are both from Okinawa, the white specimen is 58 mm, the red one is 34 mm. On the right is *Leporicypraea valentia* (Perry, 1811), a classic collector's rarity. This specimen is from Panglao, Bohol, Philippines and is 85 mm.



Sea Slugs of Southern South America:

Systematics, Biogeography and Biology of Chilean and Magellanic Nudipleura

By Michael Schrödl

ISBN 3-925919-64-3 Published 2003. ConchBooks, Mainzer Str. 25, D-55546 Hackenheim, Germany.

Review by Zvi Orlin

My interest in the Magellanic Region was fostered by a project I set myself, to study the mollusks of the Southern Ocean and adjoining regions. As up-to-date literature on the subject is very limited, this publication is a welcome addition. It sums up all the monographs published by the author in the last decade, with important supplements.

Dr. Schrödl is the Curator of the Zoologische Staatssammlung Munchen, and since 1991 has been scuba diving and collecting live specimens of the Nudipleura of the Magellanic Region as well as north along the west coast of South America, to Arica in the Peruvian Province. In addition, he participated in a trawling expedition in the Magellan Straits and Beagle Channel in 1994/5. This publication is a major part of a Ph.D. thesis presented to the University of Munich in January 2003.

Species identification includes morphological and anatomical studies, histology and scanning electron microscope (SEM) examinations, and extensive comparisons with available museum material. Seventeen collection sites are listed, their location shown on a map, dates and quantities found tabulated, all totaling over 2000 specimens. The results of this survey were: identifying 44 species collected personally; of the 108 nominal species of the study area listed, 65 are considered valid; 28 species were synonymized; 5 regarded as *nomina dubia*; and 1 shown to be a *nomen nudum*. A detailed catalogue is presented of the valid species, including: description, habitat and distribution, colored photographs of live specimens, museum and type material, and some original colored drawings. An Identification Key is also available for field studies. The author states that external features should be confirmed by anatomical study and comparison with taxonomic literature.

The zoogeographic section presents a distribution list organized by location zones, which I found most helpful in my project. There is a special chapter on endemism, (in which I am particularly interested), showing the numbers and percentages of endemic species in the different regions as well as the degree of overlap with adjoining regions. This data includes the source material. My only criticism of the book is a lack of an index. But a list organized by systematic order heads the catalogue, so each species is relatively easy to find.

The author has my utmost admiration for diving in the cold and stormy waters of the surveyed regions and his meticulously detailed recording of the data accumulated in some of the most remote and dangerous regions on our planet. I highly recommend this excellent publication to all those interested in the fauna of the regions surrounding the Southern Ocean.

Zvi Orlin.
zviorlin@actcom.co.il

In Memoriam

Betty McDonald Winner Peak
Clara Shiflett Barry Shiflett, Jr.
Sue Stephens
Luigi Raybaudi

Shell Collecting at Cape Cod: The Athearn Collection

By
Tom Eichhorst

This is not a story about wandering beaches and collecting seashells. Rather, it is the story of a family of Cape Cod shell collectors and the shells they collected. The family is the Athearn family and the collection is the combined effort of Eleanor Athearn, her sons Herbert and William Athearn, and her daughter-in-law Nadine Athearn. I first became aware of the collection when I received an email in 2001 from Jim Athearn (Nadine's son). He informed me that his mother was in her 70s and had decided to get rid of her shell collection. He asked if I could provide any information about disposing of a shell collection. My rather lengthy reply covered the options of giving or selling the collection to museums, collectors, or dealers; and included what I thought of as the pluses and minuses of each course of action. I explained on-line auctions like Ebay, pricing guides like Tom Rice's *A Catalog of Dealers' Prices for Shells*, and what to expect with the different transactions. Issue ended, as far as I was concerned. That is until a year later.

Newspaper clipping from 8 Aug 1946(Associated Newspapers) that featured Nadine Nelson (now Nadine Athearn). Stookie Allen, the author of this mini-bio of an 18 year old, became a well-known war correspondent.

Nadine at the Boston Museum of Natural History in 1940s, preparing specimens for shipment to schools for use in biology courses. By this time she also had her own biological supply business.

In 2002, I received another email from Jim advising me that his mother had decided to give the collection to me! I wrote back explaining that the collection could be worth some money and he ought to have his mother reconsider. He explained that she was adamant in her decision and that neither he nor his sister were interested in the collection. Those among you who have seen shell collections offered at various estate sales (an Ebay favorite) know that the majority of such collections are beach worn shells picked up by Aunt or Uncle Whoever and while they may bring back a treasured memory for the original collector, they are usually without data and often not worth the postage cost of mailing. So it was with this thought in mind that I first contacted Nadine Athearn.

With that first phone call it was obvious that Nadine knew what she was talking about. She let me know that the collection was housed in several wooden cabinets and that the cabinets and shells were mine if I wanted. I still was not sure that the collection would really be worth the 4,000 mile round trip and associated airfare, truck rental, hotel costs, meals, etc., but Nadine was an

engaging conversationalist and kept telling me I would not be disappointed. Finally, I set up a trip in late September 2003. My wife and I would fly from New Mexico to Cape Cod and then rent a truck to drive back with the collection. I told my wife the trip would be a nice "vacation" even if the shells turned out to be less than described. She informed me that if we went, we would return through Virginia in order to visit a few friends, a few hundred additional miles. Sounded like a deal so I made the airline reservations. I also let Nadine know that if she changed her mind and decided to sell the collection it would be fine and we would happily enjoy our visit to Cape Cod as a mini-vacation rather than a shell excursion.

On Saturday the 27th of September, my wife and I flew to Providence, R.I. We got in at 11:30 pm, rented a car and drove to the hotel. The next day we spent the morning trying to rent a truck as my "guaranteed reservation" with a well known national chain turned out to be less than guaranteed. We finally found a truck in Boston, returned the car to the airport at Providence, and drove to Nadine's home on Cape Cod.

Nadine Athearn was born Nadine Nelson on 14 November 1927. By the age of five she was already a dedicated collector of seashells and other natural history items. As a teenager she developed her collecting interests into a small private museum in her home. By the age of 18 she was teaching at the Boston Museum of Natural History. She met and married William Athearn while both were working for a natural history supply company. This involved trips across the eastern United States collecting specimens for use in college and high school science classes. Nadine also had her own private natural history supply company and spent her free time gathering local specimens for a couple of large supply houses. William was more interested in archaeology, but his mother, Eleanor, was an avid collector of land and freshwater gastropods as well as certain marine species, and his brother Herbert collected freshwater mussels. Eleanor worked as a part-time typist for Knight Hadley, a Boston area shell dealer, and of course most of her pay was taken in trade. Through the 1940s and 1950s these two were very active shell collectors. Eleanor's collection eventually passed down to Nadine, who by that time worked full time at the Woods Hole Oceanographic Institute on Cape Cod, the largest independent oceanographic research institution in the United States.

Nadine continued to actively collect locally available specimens and participated in a number of dredging operations in the Georges Banks area. After she retired she inherited Herbert Athearn's freshwater mussel collection and the house on Cape Cod became crowded with shell cabinets and individual specimens on most available surfaces. This was the situation when my wife and I met Nadine for the first time.

We arrived about 3:30 pm Sunday and were met at the door by Nadine. She then proceeded to show us seven wooden cabinets full of shells plus hundreds of boxes that had been pulled up from the basement! After opening just a couple of drawers I realized this was an extensive collection and well worth the trip. Most of the shells had not been cleaned in years and were covered with a substantial layer of dust, grime, and wood stove residue. But underneath that layer were marine shells from around the world, land snails from the eastern United States and around the world, and freshwater mussels from the United States. It was a very exciting collection and quite a bit more extensive than I anticipated. Luckily the rental truck I was finally given was larger than the one I reserved, so we were okay. We packed shells all that evening and the next

Eleanor Athearn (Nadine's mother-in-law), collected land and freshwater snails and worked as a typist for a shell dealer.

Above: Three of seven wooden shell cabinets from the Athearn collection. Each cabinet was fully stocked with shells carefully labeled with locality and identification. Below: One of the cabinets showing drawers full of land snails.

day, interspersed with trips to buy more boxes and wrapping paper. After a day and a half of packing and loading, lots of laughs with Nadine, and some fine seafood, we headed back to New Mexico with the Athearn collection.

The trip back was a nice one and we were able to stop off in Virginia to visit friends. One thing the return trip proved was that 25 years in the U.S. Air Force with 26 moves taught us how to pack. We did not lose a single shell to chipping or breaking. It will take me quite some time to catalog this very extensive collection and until I complete an added room on the house the collection sits in my garage. But in the meantime I wanted to share what turned out to be an exciting shelling adventure without ever once stepping onto a beach. Thanks to the incredible generosity of Nadine Athearn, I have seriously upgraded my shell collection. Perhaps as important as the collection was the chance to meet and talk with Nadine Athearn. Her stories of shell collecting some 50 years ago were full of wit and humor as well as insights into the world of collecting in the 1940s and 1950s. Thankfully this collection and the people responsible for this collection will not slip away into obscurity or an estate auction. Thank you Nadine, for the best shell collecting trip ever.

Nadine Athearn today at her home on Cape Cod. A remarkable woman and lifelong shell collector.

Some of the shells from the Athearn Collection. 1. *Io fluvialis* (Say, 1852), 54 mm, Tennessee River, Tennessee, (endangered due to pollution). 2. *Elliptio spinosa* Lea, 1836, 87 mm, (Altamaha spinymussel), Oemulgee River, Georgia, (threatened in many areas). 3. *Janthina janthina* (Linnaeus, 1758), 31 mm, (common janthina), worldwide pelagic in tropical seas. 4. *Chondrothyra incrassata* (Pfeiffer, 1862) form *aurantiaca* Torre & Bartsch, 1938, 28 mm, Sierra la Penitencia, Cuba. 5. *Pupinella macgregori* Sowerby, 25 mm, Rossol Island, Papua New Guinea (unable to confirm identification).

A Tale of Life Underwater off Oahu

by Bob Dayle

This fable incorporates a number of my personal experiences and direct observations of mollusks and other denizens of the deep that inhabit a portion of the diveable sites offshore of the island of Oahu. The story is fiction—no mollusks were harmed during any phase of its creation.

Prologue This is part of a longer saga, neither its start nor end. The locale is a deep-water pocket off Oahu's 'North Shore.' It is one of many ancient, submerged sinkholes around Oahu, formed in bygone Ice Ages as incredible amounts of the oceans' waters lay frozen in continental glaciers. Hawaii's shorelines were hundreds of feet lower than at present, and what is now Pearl Harbor was instead a lush tropical rain forest with several streams feeding a small lake. On all sides of that once nameless island, vast quantities of rainwater had also drained along underground routes on its way back to the ocean, causing unseen erosion... until the ground above gave way. In our Age, a drowned sinkhole is a good place to live, in relation to most cowries' needs, with its walls offering many hiding places and multiple sources of food. Through a semi-precious stone, I see two sexually mature cowries, a male and a female...

In the pocket, several hours before a moonless night ends, the male cowry, by his constant breathing/smelling of the ocean water and his touching/smelling of the crawling surfaces of the walls, finds the female cowry. After making his approach by following traces of her freshly laid trail of mucus on the living surface of the pocket wall, the male stops just short of her and announces his presence by slowly lowering a tentacle onto the trailing surface of her foot. By not immediately gliding away, or by not 'huffing' (raising her shell up slightly and jerking it back down) or worse yet, by not turning and driving the male away with a rasping blow from her radula, she has accepted the courtship. From where he is, the male extends his penis along her labral side until a special opening by her eyestalk is located. Sperm are then transferred into a sac in which the female's eggs will be fertilized.

More than a week passes; the female feeds as much as possible, both to nourish the developing eggs and to increase her energy reserves so that she can survive many days without food. Soon a night comes when she must leave the wall of the pocket for a place that her instinct demands be found, a place to lay and brood the fertile eggs she carries. Waiting until the waxing moon has set and brought on complete darkness, she is finally compelled to do the unexpected, leaving her haven-riddled home to travel through an area where cowries are not supposed to be. She crawls across sand and gravel of the pocket floor in search of (though she cannot know it) a piece of coral or limestone rubble with a cavity fit for nesting.

Trailing along behind her, that same male follows her track. His reason could be to guard against the interference of other cowries to his genetic investment, or possibly he has bonded with what may be the only other cowry he has ever encountered. As he goes, he overrides her trail of mucus with his own, but soon his purpose becomes immaterial. On that same sandy bottom, by a separate path, a *Conus marmoreus bandanus*, a molluscivorous predator, has come across the scent of the male cowry. It is the smell of food, and tonight, in the pocket's deep and quiet water, the scent hangs like a tunnel leading in two directions. The cone shell pauses, its siphon waving one way, then the other, then back again. Soon its sense of smell correctly determines which way leads to the cowry.

Unaware of nearby events, the gravid cowry glides on. By the time the cone shell has finished its meal, this cowry has found a chunk of ancient limestone rising from a gravel patch on the pocket floor. It has many cavities, some of which sea urchins had created for their own protection, long, long ago, as this area lay in the surf zone, awash with waves, . The cowry settles into an available hole just as dawn begins to assert itself here, more than ten fathoms below the ocean's surface. Nearby, a spotted eagle ray smoothly wings its way over the upper edge of this pocket's wall. With a deft maneuver, it levels into a glide just above the sandy bottom. Flying silently over the barely visible features of the bottom, it soon smells... food. With a quick zigzag move, the ray finds a certain cone shell not yet sufficiently buried in the sand. A sudden, sandy slurp is followed by several crushing chomps of its powerful jaws. Fragments of shell drift to the sandy floor... only fragments.

Nearly two weeks have passed. The female cowry still sits atop her egg mass. Positioned so that her extended siphon just reaches clear water, she continuously pumps water into her hide-away nest. The water has been used to ventilate the developing young in their egg casings through the rippling motions she makes with her foot. Now, at the dark of the moon, the egg casings begin to rupture and free-swimming veligers* issue forth to continue the cycle of growth, mating and birth. Many thousands of larvae hatch that night from the eggs of this one female.

(* — Technical note: These are not pelagic larvae; they are in coastal waters. By definition, "pelagic" excludes coastal areas, thus the phrase, "...fished pelagic veliger larvae of cowries from the plankton of Kaneohe Bay, Oahu..."[1] is oxymoronic.)

Many of this new brood of cowry larvae do not see their first dawn. Other hungry swimmers permeate the still water at the bottom of the pocket. Some are like these cowries, newly hatched, and others share their situation; anything short of good luck is fatal. When daylight does come for those still living, hiding places will be in short supply. Some will find shelter in the gravel itself, some in tiny holes in the pocket wall, and a few, perhaps even some of the cowry larvae, will hide in a shiny, freshly-emptied shell near the place where they hatched.

Afterward, the female cowry is ready to begin feeding again. Her first meal in many a day may well be what remains of the egg casings that she laid. In this way she reclaims some of the energy she put into reproduction. The remainder of the investment hangs in the quiet waters of the pocket, thousands of free-swimming veligers. Late into the night the female cowry ventures across the bottom of the pocket to the walls she left weeks before, once again becoming just another creature in that menagerie of life below the water's surface.

Months have now passed and nearly a dozen cowries, of the thousands hatched, have survived to settle and grow in this deep-water pocket. This is no freakish accident, though. For eons, 'natural selection' has favored these cowries, hatching their broods in quiet areas, as protected as possible from currents that would quickly sweep the slow-swimming larvae away from a site in which they themselves matured and mated, a place valuable to cowry life. Any free-swimming cowry veligers carried out of Oahu's coastal waters face an almost certain, swift demise in the vastness of the Pacific Ocean. Those not eaten outright will soon sink to near-abyssal depths, where low temperatures and lack of food will end their short sagas. A very lucky few may be caught in an eddy or some large circulating current that might bring them back to areas with survivable bottom conditions *before* their tiny, but growing, shells have dragged them into the dark depths that surround the Hawaiian Islands.

The veligers must come back to favorable bottom features when their time comes to literally settle down, or they will again be swept out to sea, risking that fatal plunge into the inhospitable dark depths beyond the island. Rather than cast the fate of its young to waters which are driven one way and another by winds, tides, and swells from far-away chaotic storms, the cowry, by way of the chain of events which has been named 'natural selection,' starts them in a tranquil environment where the only major threat is to be eaten, just as they themselves are eating. In the deep-water pocket, there is a chance for continued good fortune once they have settled to the bottom; for the others, vast pelagic waters hold no chance at all.

Only a few of those newly-settled cowries will be spared as other organisms feed on many of the life forms in this pocket. Enemies include octopus, crab, fish, other mollusks, and... humans. If two pairs of these cowries can survive long enough to mate and produce eggs, then some progress has been made. By the time winter storms are sending surging swells to raise pounding surf along Oahu's northern shore, this brood of cowries will have found food and shelter; mating must now wait for calmer, warmer waters to return. Then, in the pocket, several hours before a moonless night ends...

Epilogue *In the conditions depicted above, some in this group of cowries will almost certainly pair among their siblings. There is also a reasonable chance that one of the male cowries would find and mate with the female that spawned this brood, if she has survived that long. To these animals, the chance to mate is what they live for and the sooner a cowry has achieved this prime function, the better it serves the flow of life. For many hundreds of millions of years, life in the oceans has been carried forward by 'winners.' They find food, shelter, mates,... Their instincts are probably few; avoid daylight, find food, find a mate. All of the cowries I brought up from more than a few fathoms down seem to have no prior experience with the air/water barrier and their reactions to it suggest that, in this case, they have no instincts to draw upon. When considering how mollusks live and breed, it is all about 'what works.' Time and deeper research will reveal that many sympatric varieties of cowry have retained the ability to interbreed, if the need is great enough. What conditions might cause such behavior? How much time lost in searching for a sexual partner must elapse before the instinct to breed invokes action at a more basic level? 'Racial' preferences may be overridden by 'generic' behavior... or that could be suggested as occurring at a higher level in the Plan humans have drawn up for the lower animals.*

[1] Kay, E. Alison 1985. The Life of a Cowry. *Burgess' Cowries of the World*, p. 5

Bob Dayle, email: research@cowrys.org

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CONCHOLOGISTS OF AMERICA, INC.

Volume 32, No. 2 June 2004

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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President's Message

Well folks, it's been a fun and busy couple of years. I want to say thanks to all for the privilege of being your President from 2002 through 2004. We've had a good run with the organization. The folks that really made it work were those on the Board. Without their hard work and dedication, a lot of things just would not have been done. In addition, there were others such as Peggy Williams, Tom Rice, Betty Lipe and Anne Joffe along with their respective committees who have brought to play (or are about to) a series of great conferences (2002 through 2005). Betty Lipe also stepped up to take over as Advertising Director for American Conchologist. Jose Leal, along with Gary Rosenberg and Hank Chaney, have done a wonderful job in moving the educational grants program forward and seeing that the program was expanded this past year. I understand that the grant awards checks went out to the recipients in May. Donald Dan has done a wonderful job as Funding Chairman and has been very successful in coordinating the successful receipt of several significant donations to COA over the past few years. His efforts have allowed us to do more with the Grants Program, in addition to keeping the COA awards program under great management. Steve Coker and Helen Kwiat have done a great job in keeping the Treasury sound. Doris Underwood and José Coltro spent the past two years continuing to keep our membership strong. Alice Monroe as our Secretary has done an excellent job in tracking our meetings over the past two years and keeping our collective sanity together for future folks to read about! Charlotte Lloyd-Thorpe has been picking up a large number of jobs that the Board needed accomplished during this period and John Jacobs has been working on getting together an index of the past 5 years of American Conchologist. Lori Schroeder and Doc have worked hard to keep the cyber part of COA together, with Doc being our webmaster and Lori helping Lynn Scheu with getting the quarterly submittals of American Conchologist out to everyone. Hank and Mary Ruth Foglino continue to keep

(Cont'd next page)

COA property in order and Mary Ruth has worked with Jose Leal to establish a permanent home for COA's historical records at the Bailey-Matthews Museum. Lastly, I want to thank one of the hardest working contributors to our organization. Over the last year and a half he has continued to ensure that the COA produces a quality quarterly magazine that we can all be proud of. I am of course referring to Tom Eichhorst, our current Editor of American Conchologist.

Without the help of the Board, both elected officers and voluntary ones, my job would have been very difficult. Thanks you all for a great period and a lot of fun.

Happy Shelling.

Tom Grace, COA President

Editor's comments:

As I end this second year as editor of American Conchologist I want to thank the members of this organization for their patience with late (sometimes very late) issues. Each issue starts early enough, it's that darn finish line that is the problem. I also thank each and every board member and the many contributors who make this magazine possible. Without the quality stories and articles from our membership, this journal would be quickly relegated to a newsletter. The contributions over the past two years have varied from scientific/technical to collecting trip yarns, and from book reviews to reports on COA and associated club activities. This wealth of material makes the job of editor a pleasure. Well, if not a pleasure, than at least interesting.

A special heart-felt thanks to Lynn Scheu for her continued help and guidance and Bruce Neville for tirelessly correcting my English and Latin.

Finally, corrections to the story in the last issue about the Nadine Athearn collection. I stated that Nadine inherited her brother-in-law's (Herb Athearn's) unionid collection. In fact, the freshwater mussels in Nadine's collection were mostly collected by Nadine. Herb Athearn and his renowned freshwater mussel collection are at home in Tennessee. See the letter from the Tennessee Aquarium Research Institute on page 8.

Tom E.

Front cover: A composite image based upon a photograph by Jim Miller with a *Strombus alatus* Gmelin, 1791, added because who wants a beach with no shells? For more Caribbean Strombidae see the centerfold by Kevan and Linda Sunderland.

Back cover: Continuing with our stromb theme, the backcover shows another *Strombus alatus*. This time in a bit more detail than shown on the front cover. This specimen was collected in four feet of water off the west end of Mexico Beach, Florida, in 1970. It is 103mm in length.

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Shell Collecting in Iceland Part IV: The Scallop Trawlers

Moshe Erlendur Okon

Stykkisholmur is one of Iceland's most beautiful towns. It is located on the northern part of the Snaefelsnes peninsula in the west, and a large part of its population of about 1,500 people are in the fishing industry. The gulf north of the peninsula, named Breidafjordur, is where more than 90% of the scallop harvesting in Iceland is done, mostly by trawlers based in the town's harbor.

The trawlers leave early in the morning and return late in the afternoon with a catch of up to ten tons. I was fortunate to join

(Above) Stykkisholmur, West Iceland, dawn, about 11:00 AM.

(Left) A crewman hoisting the full dredge onto the trawler Hronn.

(Right, above) Contents of the dredge to be rinsed and sorted.

(Right, below) Crewmen sorting through contents, tossing anything but scallops back into the sea.

captain Bjorgvin and his crew of four on the boat Hronn and experience the daily life of an Icelandic fisherman. My first trip was in December on a bitter cold day and we had been out at sea working for several hours before the break of dawn (which comes at about 11:00 am so far north).

When the trawler reaches the designated fishing area the dredge is lowered to a depth of 15-45 meters and the boat cruises in circles as the net is filled. It is then lifted aboard and its contents emptied into a large funnel shaped container. From there the contents are carried on a belt to a slow spinning horizontal cylinder where they are rinsed and then transferred onto another belt.

Here, three of the crew members (and the freezing conchologist) stand and quickly grab any object, animal, shell, or fish that is not a scallop and toss it into a large drain (or into a bucket for later inspection) where it is washed back to sea. Only the scallops (***Chlamys islandica*** (Müller, 1776)) remain on this belt and are carried to the storage space below, where the fourth crewmember directs them into 500 kg containers. Once back on shore the scallops spend the night in a steam room and are processed the next day.

The scallops make up roughly 70% of the contents of the dredge. The other 30% are no less interesting. Among them are rocks and seaweed, very large starfish (30 cm across), big crabs, sea urchins (some of which are beautifully coloured), bottom-dwelling fish, whelks (mostly ***Buccinum undatum*** L., 1758, and ***Neptunea despecta*** (L., 1758)), and larger bivalves (sometimes ***Clinocardium ciliatum*** (Fabricius, 1780), or ***Arctica islandica*** (L., 1767), and ***Modiolus modiolus*** (L., 1758)).

While the metal net is being lifted out of the water and its contents spilled into the metal funnel, a lot of sand and mud are poured onto the deck. It is in this sediment that one can find many of the smaller shells that never make it to the conveyer belt. Normally this treasure is considered a nuisance and hosed back into the sea to keep the deck as clean and safe as possible.

Some examples of molluscs found in the sediment are: ***Acteon tornatilis*** (L., 1758); ***Amauropsis islandicus*** (Gmelin, 1791), the only European naticid with a periostracum; ***Boreotrophon clathratus*** (L., 1767) var ***gunneri*** (Loyèn, 1846), an elegant form of this Atlantic trophon; ***Colus latericeus*** (Müller, 1842), a small uncommon buccinid; ***Gibbula tumida*** (Montagu, 1803); ***Margarites groenlandicus*** (Gmelin, 1791), a circumboreal species; ***Cryptonatica affinis*** (Gmelin, 1791); ***Trichotropis borealis*** Broderip & Sowerby, 1829; and ***Velutina velutina*** (Müller, 1776), a very fragile shell with a large aperture. Among the small bivalves are: ***Astarte elliptica*** (Brown, 1827), ***Gari tellinella*** (Lamarck, 1818), ***Parvicardium pinnulatum*** (Conrad,1831), ***Spisula elliptica*** (Brown, 1827), and ***Thyasira flexuosa*** (Montagu, 1803).

Apart from the conchological value of these trawling trips, there is a side bonus, eating as many raw scallops as desired, and the gastronomical discovery: breaking a sea urchin open and eating its eggs. Delicious! There is a sightseeing boat run by Eyaferdir that sails from Stykkisholmur and, apart from the fascinating bird life, a small dredge is used to trawl for scallops as well.

Moshe Erlendur Okon

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Captions for plate on page 8.

1. *Gibbula tumida* (Montagu, 1803), 10 mm; 2. *Margarites groenlandicus* (Gmelin, 1791), 20mm; 3. *Amauropsis islandicus* (Gmelin, 1791), 24 mm; 4. *Cryptonatica affinis* (Gmelin, 1791), 29 mm; 5. *Velutina velutina* (Müller, 1776), 14 mm; 6. *Trichotropis borealis* Broderip & Sowerby, 1829, 10 mm; 7. *Colus latericeus* (Müller, 1842), 20 mm; 8. *Boreotrophon clathratus* (L., 1767) var *gunneri* (Lovèn, 1846), 27 mm; 9. *Thyasira flexuosa* (Montagu, 1803), 20 mm; 10. *Astarte elliptica* (Brown, 1827), 32 mm; 11. *Acanthocardia echinata* (L., 1758), 44 mm; 12. *Parvicardium pinnulatum* (Conrad, 1831), 14mm; 13. *Spisula elliptica* (Brown, 1827), 24 mm; 14. *Gari tellinella* (Lamarck, 1818), 21 mm.

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Below is a letter with a couple corrections to the story in the last issue regarding the Nadine Athearn collection (*mea culpa*). The letter is shown here in its entirety because of the importance of Herbert D. Athearn's collection and the imperiled status of the nation's freshwater mussels. Of the nearly 300 North American species and subspecies, various authors have estimated that 6% are extinct, an additional 15% could very well be extinct within the decade, and many more are endangered due to a variety of conditions. Editor.

Tennessee Aquarium Research Institute

Mr. Tom Eichhorst
Managing Editor
American Conchologist
4528 Quartz Drive N. E.
Rio Rancho, NM 87124-4908

May 20, 2004

Dear Mr. Eichhorst,

We enjoyed your recent article in the March 2004 issue of *American Conchologist*, profiling the collection of Mrs. Nadine Athearn of Cape Cod, Massachusetts. While we were thrilled to learn more about Mrs. Athearn and her collection, we felt compelled to set the record straight regarding a few errors with the story.

The first correction concerns the status of Mr. Herbert D. Athearn's collection in Cleveland Tennessee. Although Nadine's collection contains some material that H. D. Athearn has sent her over the years, she by no means possesses a significant component of his collection. In fact, Herbert D. Athearn is widely considered *the* definitive collector of freshwater mollusks of the 20th century. The collection of the Museum of Fluviatile Mollusks in Cleveland Tennessee, contains over 24,000 lots of freshwater mollusks primarily from the North American Continent. The collection was assembled primarily through original collections made from 1943 – 1997 by Mr. Athearn. To our knowledge, it is the largest private collection of freshwater mollusks in North America.

The lots in Herbert D. Athearn's collection are often the last collection made for some species. Due to the highly imperiled nature of freshwater mollusks, the data Mr. Athearn's collection contains are invaluable to ongoing recovery efforts for freshwater mollusks. To this task, we are currently completing an electronic database of sensitive species records from the collection for the United States Fish and Wildlife Service. The museum database project has been undertaken by the Tennessee Aquarium Research Institute (TNARI). Although Mr. Athearn continues to work with his collection, he has recently made arrangements for its eventual transfer to the North Carolina Museum of Natural Science (NCMNS), in Raleigh. Final curation of the collection will be directed by Dr. Arthur E. Bogan, Curator of Invertebrates at NCMNS.

The second minor correction deals with Knight Hadley, the Boston area shell dealer. It was Knights wife Ester who was the shell dealer. Knight Hadley ran a machine shop in Malden, Massachusetts.

Please continue the excellent editorial work with *American Conchologist*, and thank you for the opportunity to submit our corrections to your story.

Sincerely,

Herbert D. Athearn
Curator
Museum of Fluviatile Mollusks
5819 Benton Pike NE
Cleveland, TN 37323-5301

Paul D. Johnson, Ph. D.
Director
Tennessee Aquarium Research Institute
5385 Red Clay Road
Cohutta, GA 30710

Tennessee Aquarium Research Institute, 5385 Red Clay Road, Cohutta, Georgia
Phone (706) 694-4419 - Fax (706) 694-3957

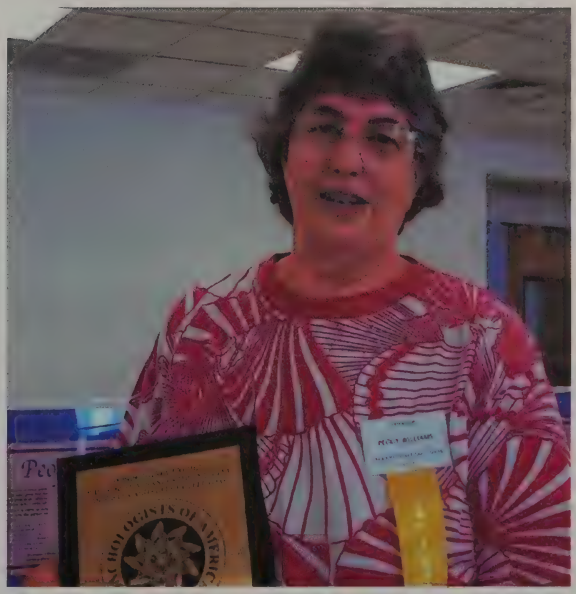
COA Award Winners

Charlotte Lloyd-Thorpe

Dr. Tom Walker won the COA Award at the 2003 British Shell Collectors Club Shell Show for his exhibit featuring "Shells Pictured on African Postage Stamps." Presenting the award is Ms. Harriet Wood (middle), Collections Manager of the National Museum of Wales, and Miss Janet Sawyer, Judge's Steward.

COA members Julius and Roberta (not shown) Sessoms won the COA Award at the Philadelphia Shell Show on November 1-2, 2003. Their exhibit "*Liguus fasciatus* According to the National Geographic" matched the March 1965 two-page article in "3-D" with shells for a beautiful exhibit.

Bob and Alice Pace were winners "Land and Fresh Water Shells From Brazil" at the Marco Island Shell Show on March 11-13, 2004. This excellent presentation included maps, internal and external anatomy, habitat, and photographs. And did I hear they also won the duPont for rare Florida/Caribbean muricids?



Peggy Williams won the COA Award with her exhibit "What's in a Name" at the Treasure Coast Shell Show on March 20-21 this year. Her exhibit showed how Latin names of shells are derived and was most informative for visitors and collectors alike.

Over 2,500 people visited the Space Coast Shell Festival and viewed Harry Berryman's award winning exhibit on January 24-25 of this year. Harry's exhibit entitled "A Sampling of the Genera of Muricinae" earned him the COA, awarded by Judges Chris Takahashi (center) and Harry G. Lee (right).

At the Naples Shell Show, February 19-22, 2004, Jim Vun Kannon proved "It's Better In the Bahamas" with his 11 cases of beautiful shells self-collected in the Bahama Islands. Great job, Jim!

CONCHOLOGISTS OF AMERICA

AWARD

Bob and Alice Pace won the COA at the Broward Shell Show for "A Few Florida/Caribbean Murex." They showed uncommon to rare muricids collected in any manner. Bob also won Shell of the Show and Self-Collected Shell of the Show.

On January 18-19 of this year Gene Everson won the COA Award with his "Marine Shells of the Panamic Province" at the Central Florida Shell Show held in Orlando, Florida. His attractive exhibit of 23 cases held common to rare species and also earned him two Shell of the Show Awards from the judges.

Leslie Crnkovic won the COA Award and the Florida/Caribbean Trophy for his well-displayed and artfully presented "Trochoidea of Honduras" exhibit at the Sanibel Show.

Invasive Species

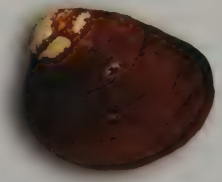
by

Tom Eichhorst

Recently a mollusk, rather well known to those of us interested in such, made national news. It was the infamous giant African land snail, *Achatina fulica* Bowdich, 1822. Officials in at least three different Wisconsin towns seized a number of these large snails that were being kept in several public school classrooms. The snails were quickly given up when word got out that they are illegal to import (alive) into the USA. Of course network news commentators made much of the possibility of the snail being a disease vector for meningitis, rather than the more prevalent threat as a voracious herbivore. This last is a moot point in our northern states with cold winters, but in Florida and other southern states, the appetite of this snail is a real concern and officials went to great lengths to control an infestation in the 1960s (see the related story in the September 2003 *American Conchologist* vol. 31:3, pp. 9-11). This same snail is a common and popular pet in several European (cold winter climate) countries.

Following the giant African land snail story by about one week was a report of introduced Burmese pythons, *Python molurus bivittatus* (also giants), in the Florida Everglades. State game management personnel in the Everglades have captured and destroyed 67 Burmese pythons in the last decade. Here, of course, the sensationalized aspect was the possibility of tourists as potential prey. Neither news story went beyond the "head line" aspects of the giant snail or the giant snake to delve into the real problem of introduced species of plants and animals.

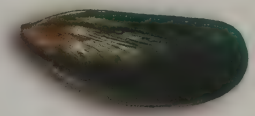
There have literally been thousands of alien plant and animal species introduced into the United States, but the majority of these are "below the public's radar." Some were introduced intentionally by government officials (ring-necked pheasant, tamarisk tree, mongoose, carp, oryx, etc.) or private individuals (pigeon, starling), while others were released by mistake (walking catfish, most of the invasive mollusks) or made it here on their own (cattle egret). Several introduced mollusks have made the news, but most are little known to any but a few experts. Land snail species such as *Helix aspersa* Müller, 1774, *Otala lactea* (Müller, 1774), and *Theba pisana* (Müller, 1774) have spread from their original ranges of Europe or the Mediterranean area to a worldwide distribution. Of the many marine and freshwater mollusks introduced to the US, there are six fairly recent immigrants that have flourished and typify the influx of invasive species that have gained a foothold in the US during the last few decades.



The freshwater Asian clam, ***Corbicula fluminea* (Müller, 1774)**, was found in the Columbia River in Washington in 1938. Officials assume it was brought in as a food item by Chinese immigrants. This is a small bivalve (<30mm) that some authors have suggested is actually two species in the US. Today it is found in at least 38 states and has caused some problems of biofouling of water works as well as unknown resource competition with endemic species.

***Melanoides tuberculatus* (Müller, 1774)** was introduced into US waters at about the same time as the Asian clam. In 1937 a San Francisco aquarium dealer acquired these "horn-of-plenty" snails from Asia. They were soon living in California waters and within a year had been introduced into Florida waters. These small snails (generally <30mm) are now spread sporadically across the US in isolated pockets. Effects of this snail on local endemic species is unknown and, while *M. tuberculatus* serves as a vector for a number of parasites that infect humans, the mechanism of infection requires that the snail be eaten by a crustacean which is in turn eaten (raw) by a human.

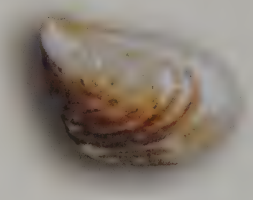
A more recent immigrant is the brown mussel, ***Perna perna* (Linnaeus, 1758)**. The brown mussel was originally found in tropical Atlantic waters around Africa and South America. In 1990 the first specimens were discovered in Texas, presumably as a result of ballast dumping by a ship. Shell size is affected by vertical distribution, with intertidal specimens reaching 90mm and sublittoral specimens growing to 120mm. The brown mussel grows rapidly and can biofoul some coastal structures, but it is also a candidate for commercial cultivation and harvesting for the seafood market.



Another recent mussel immigrant is the green mussel, ***Perna viridis* (Linnaeus, 1758)**. This species was first observed in the US in Tampa Bay in 1999. Since that time it has spread both north and south from Tampa as well as to the east coast of Florida. Like the brown mussel, introduction was probably by ship ballast. The green mussel grows to >120mm and can thickly infest coastal structures. Impact on endemic species is as yet unknown and, like the brown mussel, this species has the potential for commercial harvesting.

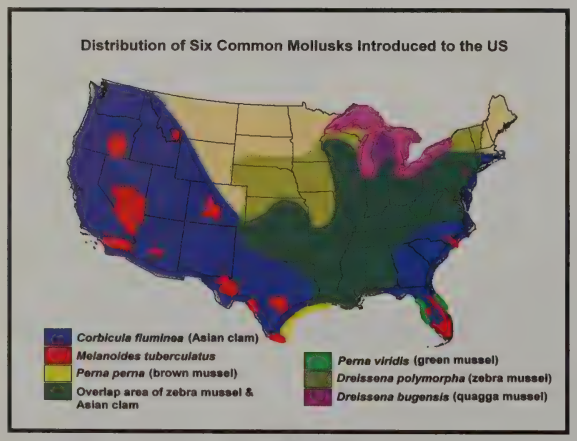
***Dreissena polymorpha* (Pallas, 1771)**, the zebra mussel, originated in Poland, parts of Russia, and the Balkans and by the early 19th century had spread throughout Europe. The zebra mussel was first discovered in Canadian waters adjacent to the Great Lakes in 1988. Again, ship ballast dumping is suspected as the means of introduction. By 1990 all of the Great Lakes were infested and this small (<50mm) mussel began rapidly spreading through northeastern, midwestern, and southern waterways. They have caused costly damage to water works, power plants, pipes, etc., by clogging intakes. One Michigan power plant measured mussel densities of 700,000 individuals per square meter! They have out-

competed endemic species for food and living space and are a serious threat to our already imperiled freshwater unionid mussels. A number of control methods have been attempted, with little real or long-term success.



***Dreissena bugensis* Andrusov, 1897**, the quagga mussel, is also from the Old World and spread from the Ukraine area to all of Europe in the 1800s. It was first seen in the US in Lake Erie in 1989 and is today spread throughout the Great Lakes, as well as in the Mississippi as far south as Alton, Illinois, and in isolated spots in New York and Pennsylvania. Although seemingly not as serious as the zebra mussel, the quagga also fouls underwater structures and can live at depths beyond those preferred by the zebra mussel. This means water inlets that were originally lowered to avoid zebra mussel fouling become targets for quagga mussels. This species was also introduced by ship ballast dumping.

These six mollusk species are reasonably representative of the gamut of species introduced into the USA. From species that have caused millions of dollars of damage like the zebra mussel to species whose effect is still a big question mark like the green mussel, these six species are all firmly established and it is doubtful they can be removed. While none is as newsworthy as a walking catfish or a Burmese python, each has the potential to do serious ecological damage and represents only a fraction of the total number of introduced species. A check of the Non-Native Aquatic Species in the Gulf of Mexico Region web site: http://nis.gsmfc.org/ or the United States Geologic Survey (USGS) web site at: http://www.usgs.gov/ will quickly demonstrate just how serious this problem has become. While government agencies are now slower to intentionally introduce non-native species, our shrinking world and expanded trade and commerce provide ready pathways for unintended introductions. It seems the geographical niches of the world that supported and separated species have been beset and overwhelmed by modern man. (The distribution map was constructed by the author based on the most recent USGS data.)



Jordan Star's Web Picks

☺ = poor, ☺☺ = fair, ☺☺☺ = good, ☺☺☺☺ = excellent, ☺☺☺☺☺ = outstanding.

☺☺☺☺☺ - **Ohio State University Division of Molluscs**, http://www.biosci.ohio-state.edu/~molluscs/OSUM2/. A parent site to Digital Murex reviewed in the past. Not much information on marine shells but then Ohio is landlocked. Links to articles on the Conch-L page and other sites. Good information on non-marine shells.

☺☺☺☺ - **The Shell Store**, http://www.theshellstore.com/. This reviewer doesn't care for the blue background (a different color on a different computer?). I don't care for frames either (screen divided into sections, menu and information area, sometimes requires scrolling). Not too easy to see color combinations, white or red text/links on blue background. Is very good for items other than specimen shells, such as crafts, jewelry, home decoration, etc. Specimen shell list can be confusing. A good source for books and supplies.

☺☺☺☺☺ - **Welcome to Chitons**, http://www.chitons.com. Excellent identification site with much information on the animal and shell parts. A comprehensive glossary is included. Pictures might be slow in loading, but well worth the wait! If you like chitons, VISIT!

☺☺☺☺☺ - **Conchologists of America** — Conch-Net HomePage, http://coa.acnatsci.org/conchnet/. Lots of information. Many links. A kid's section with games and puzzles. The home page for the Conchologists of America with a link to Conch-L, the home of the shellers newsgroup (newsletter or Listserv).

☺☺☺☺ - **The Captured Cowry**, http://www.cowrys.org. This reviewer doesn't like the background color, hard to see (blue with black text, red links). Mostly deals with Hawaiian cowries. Some pictures, in process of updating. There is an archive section of articles, a research section, and a more collector orientated section. As usual, I don't like frames. Links to some clubs, scuba collecting, cleaning, etc. Many links to information, may be hard to use, but if you like cowries, a must see site.

Links work as of 5-15-04

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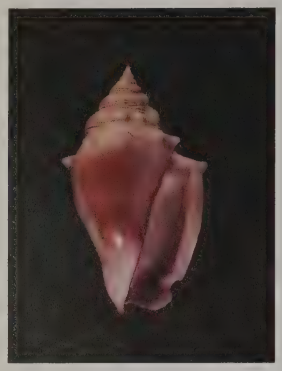
Caribbean Strombidae

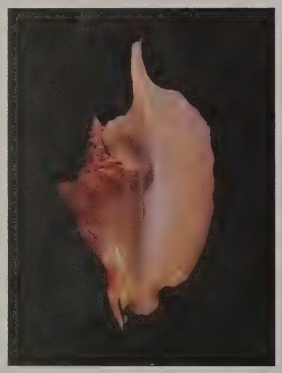
by Kevan & Linda Sunderland

Specimens illustrated from the collection of Kevan and Linda Sunderland, 9370 NW 39th Street, Sunrise, FL 33351 email: KLShells@mindspring.com.

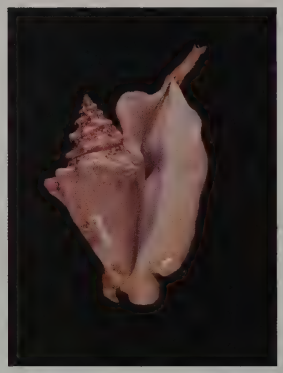


Strombus alatus Gmelin, 1791, 92mm, 3', in sand and rubble off Captiva Island, Florida.

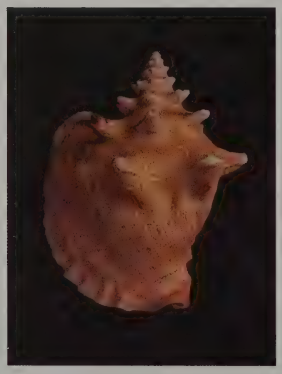
Strombus costatus Gmelin, 1791, 98mm, 20' in sand and turtlegrass, Pickles Reef, Key Largo, Florida.



Strombus gallus Linnaeus, 1758, 161mm, 10' in turtlegrass and rubble, Isle de la Gonave, Haiti.



Strombus gallus Linnaeus, 1758, dwarf, 80mm, 40' in turtlegrass, north coast of Puerto Rico.



Strombus gigas Linnaeus, 1758, 243mm, 30', in turtlegrass, oceanside, Governor's Harbour, Eleuthera, Bahamas.

Strombus gigas canaliculatus Burry, 1949, 225mm, purchased with no data.

References:

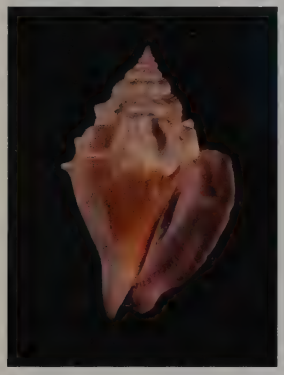
Abbott, R. Tucker. 1974. American seashells: the marine Mollusca of the Atlantic and Pacific coasts of North America. 2nd ed. New York: Van Nostrand Reinhold.

Petuch, E. J. 1993. Molluscan discoveries from the tropical western Atlantic region. New mollusks from the Gulf of Mexico, Bahamas platform, Caribbean Basin, and Brazil. La Conchiglia 24(266): 51-56.

Rosenberg, G. Malacolog 3.2.3, an electronic database of Western Atlantic Gastropods, URL: http://data.acnatsci.org/wasp/

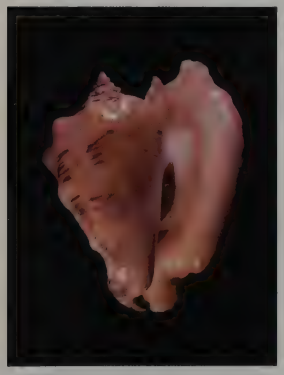
Strombus goliath **Schröter, 1805, 330mm, 15' in sand off Ponta Negra, Brazil.**

Strombus pugilis **Linnaeus, 1758, 91mm, 5' in turtlegrass, near harbor bridge, Utila, Honduras.**



Strombus pugilis sloani **Leach, 1814, 89mm, 3' in turtlegrass and rubble, Peanut Island, Lake Worth Inlet, Florida.**

Strombus pugilis worki **Petuch, 1993, 65mm, 7' in and rubble, Praia do Goes, Santos Bay, Sao Paulo State, Brazil.**



Strombus raninus **Gmelin, 1791, 102mm, 6', in sand and turtlegrass, Money Key, Florida Keys.**

Strombus raninus nanus **Bales, 1842, 36mm, 3' in turtlegrass and rubble, Peanut Island, Lake Worth Inlet, Florida.**

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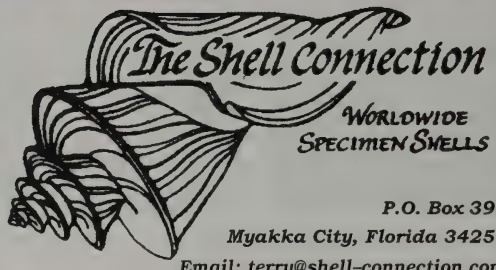

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The Ugly Duckling: *Conus californicus* 'Hinds' Reeve, 1844

by
Bruce Neville

I had always considered *Conus californicus* to be a rather nondescript little brown cone. A friend recently sent me some specimens of *C. californicus* that had the periostracum removed, and I realized that it was, in fact, a rather nondescript little *gray* cone in the proverbial plain brown wrapper. I decided to see what else I could find out about this unusual cone and discovered that underneath that plain brown wrapper is quite an interesting little animal. Almost every generalization (including this one) that can be made about cones is somehow contradicted by this unassuming species. Plain it may be, but *C. californicus* hardly deserves to be dismissed as "very uninteresting," as Dall (1910) called it.

A plainer cone would be harder to find, it's true. In shape, it is the archetypal cone, gently rounded and widest below the shoulder, "reminding one strongly of a large filbert" (Hinds, cited in I.S. Oldroyd, 1927). The spire is of low to modest height and lacks ornamentation of any sort. The body whorl, too, lacks any sculpture, beyond the few wrinkles at the anterior common to all in the genus. The exterior is a pale bluish gray, often with fine brown spiral lines, covered by a persistent brown periostracum. Juvenile shells, as illustrated in the plate, often have flecks of white on the periostracum that occasionally persist into adulthood. Golden or blackish specimens are rarely found and are illustrated by Schroeder (1977) from off Santa Barbara. The aperture is purplish. The world record is 49.0 mm (Hutsell, Hutsell, and Pisor, 2001), though a shell of 35 mm would be a large specimen.

The animal is whitish with black pepper spots that are denser on the upper surface than the lower (Hemphill, 1893, quoted in Hanna, 1963). The siphon is said by Hemphill (op. cit.) to be black and by Saunders (1959) to be white. Hemphill (op. cit.) reports small "keen" eyes borne about midway along the dark tentacles. There is an operculum, which was said to be 8.2 x 2.3 mm in a 33.7 mm animal (Hanna, 1963).

C. californicus lives from the intertidal zone down to about 30 meters, with the largest specimens found offshore (McLean, 1978). It is generally found on sandy bottoms with stones or sea grasses. *C. californicus* obviously lives a difficult life. The shell is often broken and repaired. Costa (1996) found an average of 1.28 repairs per shell, one of the highest incidences among all cones. Most of these repairs seem to be from crab attacks, though naticid drill holes have also been observed. Given the apparent survival rate following crab attacks, Costa supposed that the animal responded to such attacks by withdrawing far enough into the shell to avoid predation. Hermit crabs have been reported by several observers to occupy shells of *C. californicus*, but it is not known whether the hermits actually predated the cone or merely took up residence in already-empty shells.

C. californicus also carries a number of hangers-on. MacGinitie and MacGinitie (1949) and Costa (1996) found that the cone frequently supports *Crepidula onyx* slipper shells, sometimes as many as seven. Small *Crepidula* generally occurred near the anal slit of the cone, where Costa supposed that they gain some feeding advantage from the water current generated by the cone, while larger *Crepidula*, up to nearly the length of the "host," are generally found along the body whorl. Costa supposed that the slipper shells might provide some protection from boring predators. Of 90 cones taken from a huge cluster of egg masses, Wolfson (1974) documented *Opisthopus transversus,* a brachyuran crab, residing in the mantle cavity of 9 individuals, where they occupied approximately one-fifth of the available volume. These crabs apparently do not pierce the tissues of the "host." Although both sexes of cone can support crabs (and Wolfson's text contradicts her table on the proportions so inhabited), all of the crabs found were males. Wolfson could not document whether this reflected protandry in the crab or simply a habit during a single phase of the crab's life cycle.

As is well known, *C. californicus* is the only species of cone that reaches the Pacific coast of the United States. The current limit of its northern range appears to be the Farallon Islands off San Francisco, California, though it ranged a bit farther north during the Pleistocene epoch. At just shy of 38ºN at the Farallons, it doesn't quite hold the record for the northernmost cone. Poppe and Goto (1991) state that *Conus ventricosus* reaches "the coast of Portugal." I have a specimen of *C. ventricosus* from Olhão, Algarve, at latitude 37ºN, so it could be a toss-up between those species. Okutani (2000) records *C. fulmen* from the Oga Peninsula on Honshu, Japan, at 40ºN, which would appear to be the clear winner.

At the southern end of its range, it becomes decidedly uncommon south of the Bahía de Magdalena on the west coast of Baja California Sur, but it does reach Cabo San Lucas and slightly northward on the east coast of the Baja Peninsula to at least Ballenas Lagoon (Walls, 1979). Around Bahía de Magdalena, it coexists with many typically Panamic species of *Conus*.

Cones are active carnivores that specialize on either fishes, mollusks, or polychaete worms, and are often even further specialized within those broad groups. *C. californicus* is, however, a generalist predator and scavenger. Whysner and Saunders (1963) classified *C. californicus* as a vermivore, while Elliott and Raftery (1979) classify it as a molluscivore! It has been observed feeding on a variety of gastropods and polychaete worms in the wild, as well as a variety of other items that were probably encountered already dead. The list of documented food items (Table 1) includes all of the traditional "cuisines" within the family, plus some exotic dishes. In an aquarium, they can also be maintained on such unusual food items as bits of abalone foot, pieces of mackerel or barracuda, and *Tubifex* worms (Saunders and Wolfson, 1961). The radula of *C. californicus* is distinctly different from all other radulae so far examined (Nybakken, 1990). It has been suggested by several authors that the broad range of food items taken has evolved because of the lack of competition from other congeners throughout much of its range.

In feeding behavior, *Conus californicus* is also exceptional. Although most species of the genus are primarily nocturnal, *C. californicus* can often be found above the substrate during the day (Costa, 1996). It is also the only species known to attack prey in

***Conus californicus*: 1. juvenile (11 mm), on rocks, Sanata Barbara County, Cal., note the spotting typical of juveniles, 2. sub-adult (16 mm), near Conception, Santa Barbara Co., Cal., only a few spots visible, 3. adult with periostracum (27mm), Newport Bay, Cal., 4. Adult without periostracum (30 mm), taken on muddy sand with turtle grass at low tide, Anaheim Bay, Seal Beach, Cal.**

groups, a behavior observed both in aquarium studies and in the field (Costa, 1996). Both gastropods and polychaetes elicited strong predatory behavior in aquarium studies. Two species of *Nassarius, N. perpinguis* and *N. tegulus*, were both readily attacked, while *N. fossatus* elicited some waving of the siphon, but no attacks. Dead *N. fossatus* are readily consumed by *C. californicus* both in the aquarium and in the field. A sting is accompanied by a puff of white "smoke." When stung, *Nassarius* will often escape from their attacker(s) and multiple stings, from one or several individuals, may be necessary to subdue the prey. Alternatively, the radula may remain attached to the prey, and the cone remains attached by a thin strand of tissue. Consumption of *Nassarius* prey can take from 30 minutes to several hours. Polychaete prey is nearly always stung, while gastropod prey may not be. Both gastropods and polychaetes exhibit swelling at the site of a sting. Polychaetes writhe while being consumed live by the cones. MacGinitie and MacGinitie (1949) describe finding two *C. californicus* eating a single *Phyllaplysia taylori* from either end, much as humans might "share" a strand of spaghetti! Live fish may not be attractive prey for *C. californicus*, as sculpins (*Clinocottus analis australis*) can survive in an aquarium inhabited by cones, but are rapidly consumed when dead. *Clinocottus* is readily attacked and eaten by *C. striatus*. Fish prey is consumed whole, as it is in other species of cones, and *C. californicus* has the widest aperture relative to its size of any species in the eastern Pacific Ocean. (Except as otherwise noted, this paragraph is based chiefly on the work of Saunders and Wolfson, 1961.)

MacGinitie and MacGinitie (1949) give a detailed account of the egg laying process in *Conus californicus*.

The venom of *C. californicus* has been much studied, though not perhaps as much as some other species. Elliott (1975, 1979; Elliott and Raftery, 1979) isolated a low-molecular-weight alkaloid that they named conusine that is active on nervous and muscular tissue of mollusks. Whysner and Saunders (1963, 1966) detected a proteinaceous component in the venom that is lethal to mice and rabbits. The toxic agent(s) appear to be secreted by the venom duct, as extracts of the venom bulb showed almost no toxic activity. Although comparisons between species are difficult, the venom of *C. californicus* appears to be quite potent to vertebrates (Whysner and Saunders, 1966). There are no recorded cases of serious injury, however, to humans.

The name *Conus californicus* was long attributed to Hinds in the Zoology of the Voyage of the *Sulphur* (1844), but this publication did not appear until July of that year and was anticipated by Reeve's *Conchologica Iconica*, which appeared in January 1844 (Coomans, Moolenbeek, and Wils, 1983; Filmer, 2001). Reeve, who had probably seen an advance copy of Hinds's description, attributed the species to Hinds, but the description is that of Reeve, so it is properly cited as *Conus californicus* 'Hinds' Reeve, 1844. Despite its rather consistent appearance and the lack of congeners within its range, it has managed to acquire a few synonyms along the way; *Conus ravus* Gould, 1853, is certainly this species, and *C. dealbatus* Arthur Adams, 1853, is probably also a synonym (Walls, 1979), though Adams's description could apply to just about any cone. Oldroyd (1921) named a Pleistocene form *C. californicus fossilis*, but there is no difference between these fossils and the Recent shell.

Among those foolhardy enough to attempt assigning the various species of *Conus* to subgenera, there is no agreement on the placement of *C. californicus*. Marsh and Rippingale (1974) placed it in the genus *Lautoconus*, along with *C. africanus* and *C. mediterraneus* Hwass in Bruguière, 1792 (is *C. ventricosus* Gmelin, 1791). Old (1975) also remarked on its "striking similarity" to *C. africanus*. Indeed, in its extreme plainness, it does resemble those species and the many others of the West African province, but biogeographic considerations make such a connection unlikely. Dall

(1910) felt that the white markings in the juvenile were "of the Textile type," and Hanna (1963) considered that the markings and shape suggested a relationship with *C. lucidus* Wood, 1828, or *C. dalli* Stearns, 1873, two species that I am not convinced are all that closely related. *C. californicus* doesn't seem to belong to this rather well defined group, anyway, because it lacks the red-and-black banded siphon characteristic of the tented cones. da Motta (1991), who based his classification entirely on superficial shape of the shell, placed it in his newly-erected *Dauciconus (Ketyconus),* typified by *C. tinianus,* giving it an entirely new set of "relatives." Keen (1971) may have come closest when she placed it in *Chelyconus*, along with such species as *C. purpurascens* Broderip, 1833, and *C. vittatus* Hwass in Bruguière, 1792. Obviously, *C. californicus* has no close living relatives, and the mystery of its origins will have to remain for now just one of the many puzzles surrounding this very fascinating but vastly underappreciated cone.

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Table 1. Documented food items of *Conus californicus*

Species	Field/Aquarium	Live/Dead	Reference
Prosobranch Gastropods			
Astraea undosa	Field	Dead	Saunders & Wolfson, 1961
Haliotis fulgens	Aquarium	Dead (pieces)	Saunders & Wolfson, 1961
Jaton festivus	Field	Live, escaped	Hiegardner, 1957
Nassarius fossatus	Both	Dead	Saunders & Wolfson, 1961
Nassarius tegulus	Both	Live	Saunders, 1959
Nassarius perpinguis	Both	Live	Saunders, 1959
Norrisia norrisi	Aquarium	Dead	Saunders & Wolfson, 1961
Olivella biplicata	Field	Dead	Hinegardner, 1957
Polinices recluzianus	Field	Dead	Saunders, 1959
Tegula funebralis	Field	Moribund	Hinegardner, 1957
Opisthobranch Gastropods			
Bulla gouldiana	Field?	Dead	Saunders & Wolfson, 1961
Navanax inermis	Field	Unknown	Kohn, 1966
Phyllaplysia taylori	Field	Not Specified	MacGinitie & MacGinitie, 1949
Bivalves			
Chione californiensis	Field	Dead	Saunders & Wolfson, 1961
Macoma nasuta	Field	Dead	Saunders & Wolfson, 1961
Pecten sp.	Field	Dead	Saunders & Wolfson, 1961
Solen rosaceus	Field	Dead	Saunders & Wolfson, 1961
Tagelus californianus	Field	Dead	Saunders & Wolfson, 1961
Tellina arenica	Field	Dead	Saunders & Wolfson, 1961
Cephalopods			
Octopus bimaculatus	Field	Dead	Hinegardner, 1957
Fishes			
Clinocottus analis australis	Aquarium	Dead	Saunders & Wolfson, 1961
Hypsoblennius gilberti	Aquarium	Dead	Saunders & Wolfson, 1961
Unindentified fish sp.	Field	Unknown	Saunders & Wolfson, 1961
Barracuda	Aquarium	Dead (pieces)	Saunders & Wolfson, 1961
Mackerel	Aquarium	Dead (pieces)	Saunders & Wolfson, 1961
Polychaetes			
Arenicola cristata	Field	Live	Saunders & Wolfson, 1961
Glycera robusta	Both	Live	Saunders & Wolfson, 1961
Oligochaetes			
Tubifex	Aquarium	Unknown	Saunders & Wolfson, 1961
Unidentified earthworms	Aquarium	Live	Saunders & Wolfson, 1961
Amphipods			
Melita sp.	Field	Unknown	Kohn, 1966

A Review of:

Taming the Oyster – A History of Evolving Shellfisheries and the National Shellfisheries Association

by

Melbourne R. Carriker

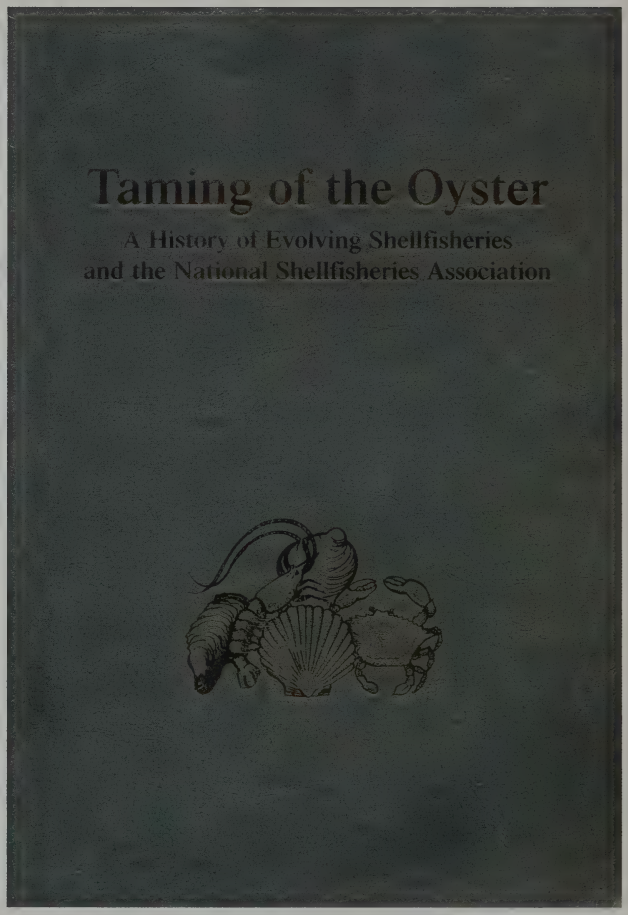
Review by Tom Eichhorst

This fascinating book presents a history of the National Shellfisheries Association (NSA) of the United States as well as allied and precursor organizations. This is a complex tale involving the interplay and off-and-on partnerships between professional organizations: the National Shellfisheries Association (NSA) and its two forerunners, the National Association of Shellfish Commissioners (NASC) and the National Association of Fish Commissioners (NAFC), trade organizations: the Oyster Growers and Dealers Association of North America (OGDA), the Oyster Institute of North America (OINA), the Shellfish Institute of North America (SINA), and the Molluscan Shellfish Institute (MSI), and the government: U.S. Department of Agriculture (USDA), Interstate Shellfish Sanitation Conference (ISSC), and state regulatory agencies. The history of these organizations and the interplay between them is the history of shellfisheries in the United States.

This is all told by Melbourne R. Carriker, Professor Emeritus of the College of Marine Studies at the University of Delaware, a distinguished professional malacologist. Dr. Carriker presents over 100 years of industry and organizational history. He has been intimately involved with the NSA from 1942 to the present, and much of this history is told from an insider's viewpoint.

The book is organized around the actions (both official and unofficial) at various meetings through the years as the organization struggled with a myriad of problems; from such mundane issues as finances, relationships with other organizations, membership numbers and demographics; to such critical issues as disastrous shellfish diseases, industry crippling pollution, federal and state laws and regulations, politics, and the first real beginnings of aquaculture in the mid 1970s. The reader is swept from the early days of oyster fishermen concerned with marketing their catch and controlling that market, to the modern NSA concerned with improving the environment, developing aquaculture, and ensuring a sustainable yield from the ocean.

Dr. Carriker's book is not a colorful tome full of tales of collecting in exotic localities, it presents little of the natural history of Mollusca, and it does not serve as an aide to seashell identification. But it does provide an in-depth look at the good and the bad of the nation's shellfisheries and the organizations that grew and often withered and died trying to support and study the shellfish and aquaculture industry. It is clearly (and sometimes cleverly) written; a must read for anyone concerned with the shellfish industry. For us outsiders it is an intriguing look at the more commercial aspect of our nation's ocean fauna. Additionally, it is the history of an organization (the NSA) that learned to balance scientific and industry concerns and has strived over the years to protect the environment and halt the destructive pollution of our waterways and oceans.



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All donations below $1,000, whether from organizations or individuals will be directed to COA's Walter Sage Fund, from which grants will be made for Board-approved projects.

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For gifts of $1,000 or more, a donor has the option of naming a grant. For example, a shell club might fund annual grants in the club's name. A further option is to establish a named grant in perpetuity by giving a sum of $10,000 or more. This amount may be given as a lump sum, or over a period of up to ten years, with a minimum initial gift of at least $1,000. If someone sets out to create an endowed fund, but does not reach the $10,000 level within ten years, including accrued interest, the funds will revert to the Walter Sage Fund.

Once an endowed fund has reached $10,000, COA will use half of the income to award grants, and reinvest half to ensure that the fund continues to grow. As a conservative assumption, consider that a $10,000 fund earns 5% interest. The annual income will be $500, half of which can go to grant, and half of which is reinvested in the fund. A $10,000 endowment would therefore fund a $500 grant every other year.

COA's by-laws have rules for the investment of funds controlled by the organization. Endowed funds will be pooled for investment purposes, but the principal and interest of each fund will be tracked separately. COA will try to match grants to the stated interests of donors, but cannot guarantee that matches will be exact. A shell club may prefer that grants be given to a graduate student at a local university, or an individual might prefer grants directed toward study of a particular group of mollusks, but if matches are not found, a grant may be awarded to another deserving proposal that is consistent with COA's goals. The current guidelines for grants may be viewed on COA's website (http://coa.acnatsci.org/conchnet/). Currently grants are restricted to citizens or permanent residents of any country in North, South, or Central America or the Caribbean, or to students attending graduate school in the United States.

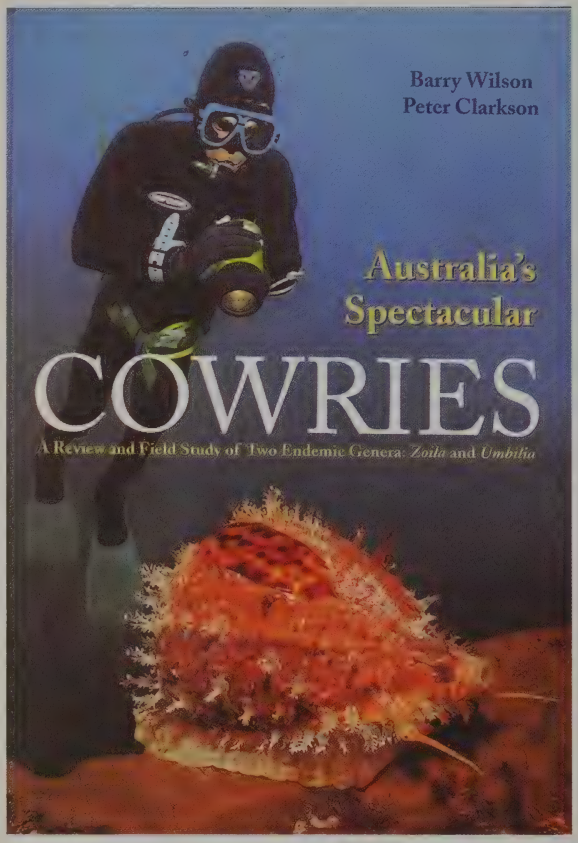
In practice, most grants go to graduate students, but they may also be made to conchologists, shell clubs, or professional malacologists, as long as the proposals are approved by the Grant Committee and the Board. Currently about $10,000 per year is marked for grants from the operating budget, and another $400 to $500 per year comes from the Walter Sage Fund.

Parties interested in participating in the COA Grant Program should contact:

Dr. Jose Leal, The Bailey-Matthews Shell Museum, P.O. Box 1580, Sanibel, FL 33957, USA
Tel. (239) 395-2233, Fax (239) 395-6706, e-mail: jleal@shellmuseum.org

A Review of Three Recent Cowry Books
"distinctly different and equally excellent"

Review by:
Leslie Allen Crnkovic
HARF-IMCS Natural History Books
Houston, Texas - Leslie@harf.org



Australia's Spectacular Cowries – A Review & Field Study of Two Endemic Genera: Zoila & Umbilia (a concise easy-to-read guide to the endemic Australian Cowries) by Dr. Barry R. Wilson and Peter Clarkson© 2004, Odyssey Publishing ISBN: 09661720-2-7 List: $125.00 US, 406 (A4) pages, full color, 600 specimen photos, 250 live photos. Photo hard cover. Printed in Australia.

Covers the *Zoila* and *Umbilia* of Australia, fully illustrated in color. Includes 406 pages of color photos and text, with photographs of over 600 specimens representing each of the known variations of every species. Also includes more than 250 photos of live specimens in their natural habitat, along with distribution maps.

This comprehensive volume is designed as a practical handbook for the Shell Collector, Conchologist, Malacologist, Marine Biologist, Diver, Student, and Naturalist. Covering 10 species of endemic Australian Genera *Zoila* and *Umbilia*, it offers an impressive collection of information on the variation, distribution, habitats, and living and fossil history of these popular and beautiful marine animals. Most of the species in these groups are characterized by extreme variability in shell form and color pattern.

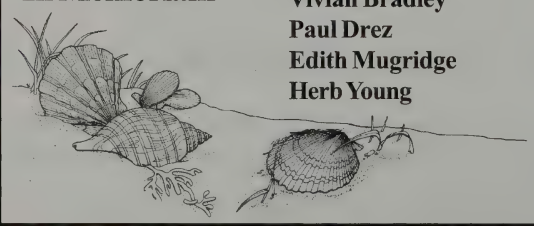
"As Wilson and Clarkson wrote this monograph, there was an awful lot of inherited "taxonomy" that had to be reconciled. Together they have successfully created a very defensible and relatively simple system, which has clarified the varying taxa and synonymies. The reader will be thankfully unburdened on the subject of Cowry taxonomy and nomenclature when he absorbs the processes and conclusions of Wilson and Clarkson's approach to the classification of these two uniquely Australian groups (*Zoila* in particular)," (Dr. Harry G. Lee).

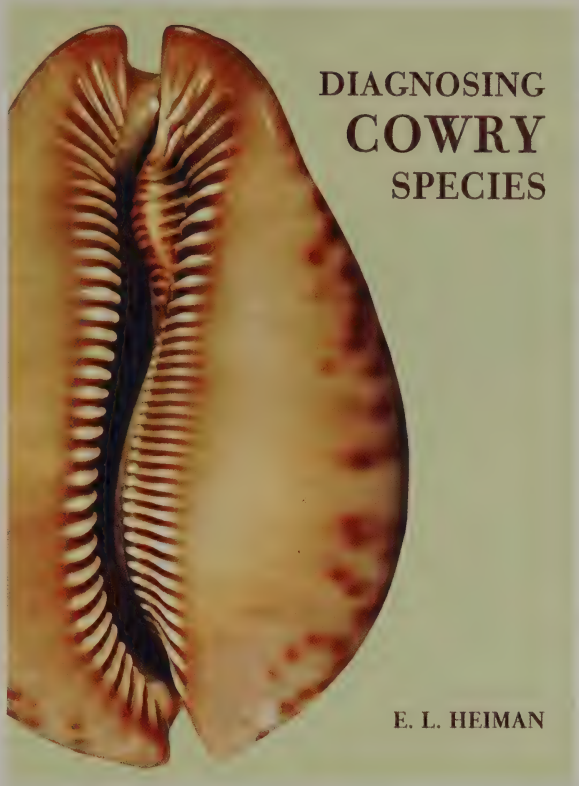
"At the 2004 National Australian Shell Show in Adelaide, this long-awaited new Cowry book was launched. For the first time hundreds of shells are shown in their natural habitats with an emphasis not only on the shells, but also the host sponges and general environment. This is truly a monumental work and possibly for the first time in Australian Malacological history, exact data and locations are given for these magnificent Cowries. It has caused a furor amongst local commercial shell divers (it has given the family jewels away), but what a wonderful legacy to leave the shell world!" (Australian Shell Dealer Hugh Morrison).

The cover-to-cover color will spoil us all. Even the tables, maps and text headers are in color. The maps have photos of shell forms inserted with arrows to the exact locations. Thanks to the publisher, John D. Jackson, for going all out on this one! This is sure to be a must-have volume for the library of any serious *Cypraea* collector!

In Memoriam

Vivian Bradley
Paul Drez
Edith Mugridge
Herb Young





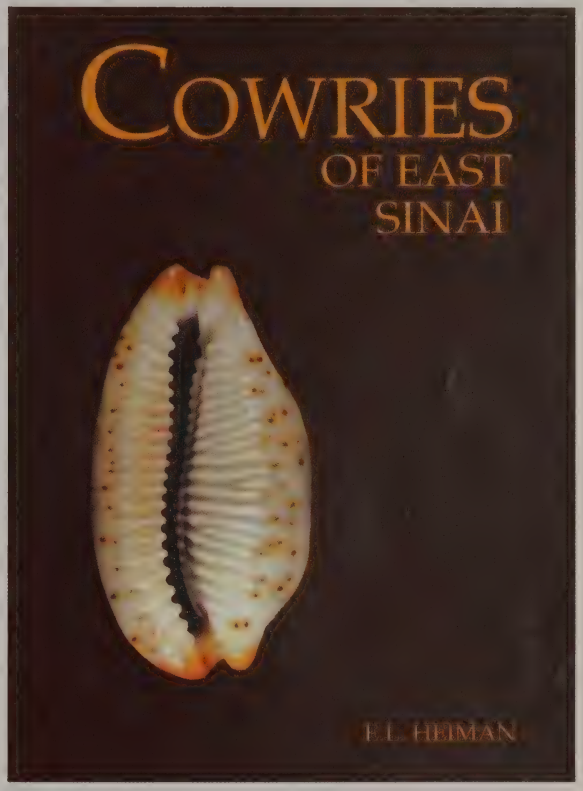
Diagnosing Cowry Species by Dr. Eduard L. Heiman & B. S. Singer, Editor© 2004 E. L. Heiman ISBN 965-90588-0-2 List: $80.00 US, 160 (A4) pages, 48 color plates, numerous b/w illustrations, maps, tables, a detailed index of Cowry taxa, and a bibliography of 394 works. Wire bound photo soft cover. Printed in Israel.

In his second book on Cowries, Dr. Heiman tackles the harder issues contained within the many over-named species and forms of *Cypraea*. This type of book is long overdue as a concise way to properly reconcile the identity of cowries. It is designed to be an easy-to-use manual enabling malacologists and shell collectors to identify cowries using shell characters for 268 extant species.

A criterion called "Main Diagnostic Shell Character" (MDSC) is established and all 268 taxa are critically examined accordingly. Each species must be distinguished by at least one well-recognizable shell character "MDSC" that shows no intermediate stages. Using this criterion, it was possible to diagnose 211 species, 14 subspecies and 19 synonyms. The remaining 24 taxa are either rare shells that were not available for study or populations of which the descriptive shell characters are not yet established.

The reader will find shell comparison easy, since shells with similar MDSC are grouped together with color illustrations on the same page. Additional information that may provide extra clues for distinguishing between species of similar appearance includes: notes to supplement the MSDC, discussion of several groups of cowry taxa that are especially difficult to tell apart, and a list of genera and the distribution of taxa with similar shells.

Some photographs were provided by: Robert Janowsky, Brian Hayes, Marty Beals, L. M. Raybaudi, Liltved Ikeda. Typesetting, layout and the cover design are by Eduard and Bella Heiman. This book is precision-bound with a wire comb and not a spiral wire. This type of binding was chosen so that it can be used intensively without damaging the binding. Eduard's "MDSC" is a most clever innovation…why didn't someone think to do this sooner!



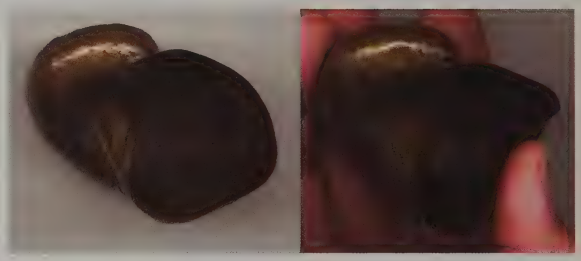
Cowries of East Sinai by Dr. Eduard L. Heiman, Moshe Erlendur Okon, Editor© 2002 E. L. Heiman ISBN 965-555-106-7 List: $80.00 US, 208 (A4) pages, 46 tables, 720 illustrations (360 color & 360 b/w photos) including 32 full-color plates, a detailed general index and bibliography of 187 works. Photo hard cover. Printed in Israel.

This work covers the *Cypraea* species from the Gulf of Aqaba to the Red Sea. Dr. Heiman discusses each cowry species, subspecies and form in great detail from various localities, while also republishing many of the illustrations by original authors. The diligent use of tables, B&W photos, illustrations and maps, plus 32 full-page color plates at the end, gives the layout of the book a comprehensive schema for the understanding of the characteristics and range of each species in all its forms. Notably, the rich coffee-colored hardcover and gold ribbon bookmark make this both an elegant and functional work.

Shell Curiosity: *Stylobates aeneus* Dall, 1903

by

Tom Eichhorst (thomas@rt66.com)



At last year's COA convention in Tacoma, Washington, I picked up the specimen shown here. Several of these shells were offered by Chris Takahashi. I initially passed by what I took to be a brown, rather uninteresting trochid. But while looking at another shell, Chris asked if I had seen the *Stylobates*. He pulled it out of the box and handed me this rubbery shell; I was hooked. Identified as only *Stylobates* sp., the data slip said it was crabbed at 2,000+ feet off Hawaii. Apparently several of these shells were found in deep-water shrimp traps meant for a large red shrimp popular in Japan. Once brought to the surface the shells must be immediately immersed in preservative or they dry and shatter. After preservation (presumedly in glycerin) the shell retains its soft, rubber-like character. So what is a *Stylobates*?

The genus *Stylobates* is in the class Anthozoa, subclass Hexacorallia, order Actiniaria, suborder Nyantheae, tribe Thenaria, family Actiniidae. If none of these names seems familiar, that is because this is a type of sea anemone! There are only a two or three species in the genus *Stylobates*, and all are fairly similar in life history and habits. Members of this genus attach themselves to a seashell and, more or less, cover the shell with a soft flexible "outer skin" called the carcoenecium. As this pertains to *Stylobates aeneus*, the anemnone does more than just cover the shell.

At the core of this "shell" is a small seashell. After the death of the original inhabitant, this seashell becomes inhabited by a deep-water hermit crab (usually *Parapagurus dofleini* in Hawaiian specimens) and is subsequently colonized by the *Stylobates aeneus* anemone. The anemone completely covers the shell structure with a thin flexible chitinous coating. But where most *Stylobates* species merely cover the shell, *Stylobates aeneus* continues to build its own shell. In the 63mm specimen pictured, the original shell is a small remnant in the spire of only about 5mm! The anemone builds the rest of the structure, over 90%. In fact, the original seashell does not dictate the structure and shape, and is often dissolved completely away. No matter what type of seashell is colonized, the anemone builds a brown, trochid-shaped shell. Through this entire process, a hermit crab continues to occupy the shell, even though the shell it occupies is soon the anemone's structure and not the original calcium seashell. It is not known if the same hermit crab remains in residence as the shell grows. Some theorize the hermit crab may actually dictate the shape of the carcoenecium. All *Stylobates* shells are dextral, or right-handed, but nothing in the anemone's anatomy requires such a structure. The hermit crab, however, has a dextrally coiled abdomen and this may influence the *Stylobates* structure. It is because of the hermit crab's taste for shrimp bait that we are able to obtain this shell.

Other species within the genus show an area of tentacles, usually on the ventral surface behind the mouth of the resident hermit crab. But these soft-parts on *Stylobates aeneus* seem easily shed as none of the half dozen specimens offered by Chris or the holotype named by Dall, evidence any sign of tentacles. Only the shell-shaped carcoenecium remains. Thus, it is understandable that Dall originally described *Stylobates aeneus* in 1903 as a mollusk, "A New Species of Trochidae," *Nautilus*, vol. 17:6, pp. 61-62. This original shell, without a preservative, would have been thin and brittle, very much unlike the rubbery shell shown here. By 1919 Dall realized there might be a problem with his original classification and wrote, "*Stylobates*, A Warning," *Nautilus* vol. 32:3, pp. 79-80. The holotype of *Stylobates aeneus* (Cat. # USNM 795117) is located at the National Museum of Natural History (Smithsonian) in Washington, D.C. It has a type locality of Hawaii and the specimen is broken into several pieces, indicating it was allowed to dry and was not treated with glycerin.

As the image above indicates, this specimen is still flexible after a year in a dry desert climate. The shell is very light weight (2.95 grams total weight) and feels like a fake shell made out of rubber. Its longest dimension is 63mm and Chris had specimens that were at least 80mm or more. It appears to be much the same thickness throughout, the thickness of a single sheet of typing paper. It is deeply umbillicate, the suture is impressed, and there are numerous axial growth striae and only 1 1/2 whorls after the initial portion formed by the seashell.

More information on this interesting group of animals and an image of the holotype can be found online at: http://hercules.kgs.ku.edu/hexacoral/anemone2/index.cfm. A complete description of *Stylobates* is in Dunn, Daphne Fautin; Devaney, Dennis M.; & Roth, Barry. 1980. *"Stylobates*: A shell-forming sea anemone (Coelenterata, Anthozoa, Actiniidae)," *Pacific Science* vol. 34:4, pp. 379-388.

INTRASPECIFIC VARIABILITY, SPECIES LIMITS AND CONCHOLOGICAL METHODS

by Eduard L. Heiman

Distinguishing between species, subspecies and varieties (formae) is a daily exercise for shell collectors. This is sometimes a difficult task for several reasons: universal definitions of species and other taxonomic categories acceptable for all groups of living organisms do not exist, and different methods of determining the taxonomic identity of molluscs are sometimes combined in descriptions of species or other taxa. The only scientific method of practical use to most shell collectors is the conchological method based on the assumption that the mollusc's shell reflects certain qualities unique to each species; collectors cannot check whether their specimens belong to a taxon described by a non-conchological method.

A definition of species that works well with cowries and other mollusc families, reads: species are groups of populations, the shells of which can be separated from shells of all other populations of the family by at least one well-recognizable diagnostic shell character showing no intermediate forms. Subspecies are geographically separated populations, the majority of which differ by at least one shell characteristic from other groups of populations of the same species. Thus, comparing the difference in shell characters, it is possible to determine the specific identity of the shells being studied. A shell character is a natural quality of a shell (color, shape, size, pattern, etc.). Each shell can be described by dozens of shell characters but only some are suitable for diagnosing species. These shell characters are the main diagnostic characters.

Diagnostic shell characters of some molluscs are distinctive and it is not difficult to identify them; for example, *Lyncina argus* (Linnaeus, 1758), *Lyncina aurantium* (Gmelin, 1791), *Conus genuanus* (Linnaeus, 1758), and *Volutoconus bednalli* (Brazier, 1878). Diagnosing shell characters of other molluscs is more complicated because of groups of conchologically similar species. Here one should know the main diagnostic characters distinguishing the groups. Sometimes several diagnostic characters must be used, but in some cases a single consistent diagnostic shell character is sufficient, for example, in distinguishing between *Erosaria spurca* (Linnaeus, 1758) and *Erosaria acicularis* (Gmelin, 1791) (Figs. 1-2). The shell base is always white in *E. acicularis* and it is tan or beige in *E. spurca*. Diagnosing species is not difficult if their main diagnostic shell characters are correctly defined in the original description or in the malacological literature. Only shell characters that belong to all individuals of a species are suitable for correct diagnoses. Other shell characters may be auxiliary, as for example, the angled sides in shells of *E. acicularis* (Fig. 3) that can be found in many (but not all) shells of this species, but are rare in *E. spurca*.

Main diagnostic shell characters are important in order to set the limits of species as conchologically separable units of specimens; these limits are sometimes difficult to determine if the intraspecific variability is not taken into account. All shell characters are variable. Conchological methods can be used to study individual variation, i.e., the difference between individuals of a given mollusc population and geographical variation, which is the difference between geographically isolated populations of a species as a whole.

For studying individual variation, it is necessary to know all deviations from the typical in the shape, profile, color, pattern, callosity and so forth, and the percentage of shells showing these deviations within all populations. Large batches of shells should be studied because rare phenomena may have a considerable influence on the taxonomic conclusion. For example, it is widely accepted that *Erosaria nebrites* (Melvill, 1888) is a valid species and not a subspecies of *Erosaria erosa* (Linnaeus, 1758), because the former lacks several shell characters of *E. erosa*. The dorsomarginal blotches are not visible from the beige base. (The base is white in *E. erosa*.) This difference can be traced in thousands of shells of both species, but sometimes exceptions to the rule are found (Figs. 4-6) and the dorsomarginal blotches are visible when viewing the base of shells of *E. nebrites*, or in specimens of *E. erosa* the base is beige to tan with dark lines and spots. Such unusual individuals, differing from the other specimens of a population in shape, color or pattern, refer to intraspecific taxa called formae (varieties).

Some species of cowries produce numerous formae: 16 are known in *E. nebrites*, 15 in *Erosaria turdus pardalina* (Dunker, 1852), 12 in *Mauritia arabica grayana* Schilder, 1930. Formae may arise sporadically and later disappear or they can be consistently observed in many populations in differing proportions. The term formae is also used to describe similar features seen in different species. Figs. 7-10 illustrate shells having the shape of forma dilatata characterized by the dilated outer lip. In Figs. 11-12, forma labrospinosa is illustrated with spines and tubercles on the base and margins. Forma saturata can be characterized by rich and dark colored shells and is known to shell collectors under different names: atra, atrata, melanica, nigrescens, obscura etc. This forma is mentioned in the malacological literature for at least 87 cowry species. Forma rostrata is known in more than 40 cowry species. Formae can be rare and found only once in several years, but sometimes they arise in large numbers and a large batch of such shells taken alone can be mistakenly interpreted as a new species or subspecies.

For studying geographical variation, conchologists use statistical data that are the result of measurements and calculations, i.e., shell characteristics. When comparing the average shell length, width, diameter, height, number of teeth, etc., of different populations of the same species, it is possible to draw a conclusion whether or not gradual evolution resulted in the appearance of a potential new taxon inside the species, which can then be recognized as subspecies (see definition above). Some malacologists do not recognize subspecies or treat them in the same way as formae. Others, however, consider subspecies as geographically isolated groups of mollusc populations observed at different stages of the evolutionary process of their transformation into new species, the process of speciation. The majority of shells of a subspecies share

the main diagnostic shell characters of the species, but differ from other populations of the same species by at least one shell characteristic; for example in cowries, by the shell size, presence or absence of the dorsal blotch, number of teeth and their shape, etc. Subspecies often evolve in separated or outlying areas in the range of distribution of the species where there is a greater chance of their being geographically isolated. *Erosaria lamarckii lamarckii* (Gray, 1825) inhabits the waters bordering East Africa and *Erosaria lamarckii redimita* (Melvill, 1888) is known from Thailand; *Cypraea tigris tigris* Linnaeus, 1758, lives in the Indian Ocean and the West Pacific Ocean and *Cypraea tigris schilderiana* Cate, 1961, inhabits Hawaiian waters. Some subspecies can be observed at the stage in their evolution where it is difficult to decide whether or not they have already reached a status of full species, as in the above example with *E. erosa* and *E. nebrites*.

Knowing the different formae and subspecies helps in defining the limits of the species and may avert possible problems that can arise when clear diagnostic characters were not given in the original description of the species. This omission was a common practice in the past, as for instance, *Blasicrura subteres* (Weinkauff, 1881) from French Polynesia (mainly the Tuamotu Archipelago). Shells of *B. subteres* are similar to miniature *B. teres* (Gmelin, 1791): their shape is cylindrical as in many *B. teres*, the right margin is distinctly angled, the dorsal pattern consists of three transverse dark bands, the base is white, the aperture is narrow and the fossula denticulate, and the posterior portion of the inner lip is straight, projecting and connected in an ear-like way to the outer lip by a gradually recurved dorsal edge of the posterior canal. *B. subteres* differs from *B. teres* by the shell characters, which can be considered as "more" or "less": the shells are smaller, thinner, and more cylindrical; the right side is margined acutely; teeth are finer; the fossula is more shallow and less concave; and the posterior portion of the inner lip is more projecting (Figs. 13-16). It is still not clear whether the only shell characters helping to separate *B. subteres* from *B. teres*, the absence of the dorsal blotch and the posterior callosity of the dorsum, are of specific rank. These distinguishing shell characters should be remembered when one compares different populations of *B. subteres* and *B. teres*.

Suppose one studies a batch of shells from French Polynesia that are smaller and more cylindrical than typical shells of *B. teres* from this area and have additional peculiarities: they are more callused, have the distinct posterior dorsal callosity and slightly different coloration and are not from the typical locality of *B. subteres*. How do we treat this batch of shells, as an unusual forma or subspecies of *B. teres* that differs by the more slender and smaller size, or as an unusual forma or subspecies of *B. subteres* that differs by the shell characters typically absent in *B. teres*? It seems to me that relating it to *B. subteres* will not be correct because doing so will exceed the accepted limits of this species mentioned above. Perhaps this is a population linking *B. subteres* to *B. teres* in the same geographical area? In this case the specific rank of *B. subteres* is doubtful. Apparently study of more conchological material is needed in order arrive at the answer to these questions. This is only one example of many cases where thorough analysis of shell characters and characteristics is needed in order to get some idea about species limits and the taxonomic identity of known and new mollusc populations. Problems of this kind can often be solved by using statistical conchological methods. An example is *Cribrarula cribellum* (Gaskoin, 1849), which was considered a valid species for a long time. I found no scientific evidence that cowry populations having small, distinctly elongated, narrow and depressed (*cribellum*-like) shells were living together with *Cribrarula esontropia* (Duclos, 1833) in the waters bordering Mauritius and Reunion Islands and treated *cribellum* as a synonym of *esontropia*. I was pleased to note that Dr. M. Jay independently drew the same conclusion after a statistical analysis of 702 specimens of *Cribrarula* from Reunion (2003, Xenophora 103:20-22).

Of course, the conchological methods are not universal; they cannot be used for unshelled molluscs. But using shells for checking the identity of mollusc populations and the study of intraspecific variability is an indirect method of long standing, that usually works well and has been used in science for about 300 years. It would be difficult to image two different mollusc species having absolutely identical shells. It is well worth continuing to use these methods in our taxonomic practice and to fix and analyze each case when diagnostic characters are chosen incorrectly.

To name or not to name mollusc populations that have already evolved as subspecies and how to treat numerous formae in the malacological literature is another question which deserves intensive discussion.

I would like to thank my friend Solly Singer, the English editor of TRITON, a journal of the Israel Malacological Society, for a fruitful discussion and help with preparation of this article.

E-mail: heimel@netvision.net.il

Page 31 Photograph Captions

Fig. 1. *Erosaria spurca*, the base is beige or tan colored (Mediterranean Sea, Israel)
Fig. 2. *Erosaria acicularis*, the base is white (Florida coasts).
Fig. 3. Angled sides in *Erosaria acicularis* (Florida coasts).
Fig. 4-5. *Erosaria nebrites* (Melvill, 1888) f. erosaides; dorsomarginal blotches are visible from the base (East Sinai).
Fig. 6. *Erosaria erosa* (L. 1758) f. pigmented; tan base with dark lines (Madagascar, Tulear).
Fig. 7. *Erosaria nebrites* f. dilatata (East Sinai).
Fig. 8. *Erosaria erosa* f. dilatata (QLD, Australia).
Fig. 9. *Erosaria turdus pardalina* f. dilatata (East Sinai).
Fig. 10. *Mauritia arabica* f. dilatata (The Philippines).
Fig. 11. *Erosaria nebrites* f. labrospinosa (East Sinai).
Fig. 12. *Erosaria erosa* f. labrospinosa (Maldives).
Fig. 13. *Blasicrura teres*, typical dorsal pattern (Zanzibar).
Fig. 14. *Blasicrura teres*, callosity near the posterior extremity (Tahiti).
Fig. 15. *Blasicrura subteres*, dorsal pattern (Tuamotu).
Fig. 16. *Blasicrura subteres*, callosity near the posterior extremity is absent (Tuamotu).

Fig. 1.

Fig. 2.

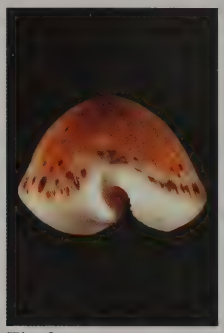


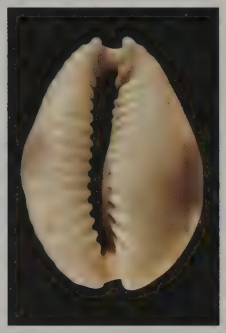
Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.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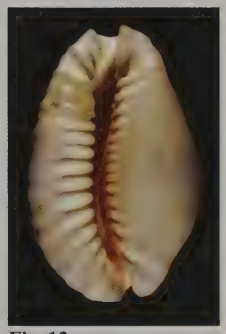
Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 16.

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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America

CONCHOLOGISTS OF AMERICA, INC.

Volume 32, No. 3 September 2004

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: ***Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.***

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President's Message

With the conclusion of another very successful annual meeting, I begin my tenure as COA President being informed by our editor to keep my maiden comments brief in order to accommodate the great articles herein. Don't worry; I'll make up for it in a future issue.

Thanks first to Betty Lipe and all her volunteers for a splendid meeting in Tampa, another high point in her continued long service to the COA. Thanks also to Jeff Schroeder who is retiring as our webmaster, for the many, many hours of help with what is now an integral part of our "public face." While most members of the COA Board remain in place, we welcome the addition of long-time members Bobbi Cordy as secretary and Carole Marshall as trustee, while thanking Charlotte Lloyd-Thorpe as the outgoing trustee and Alice Monroe as the outgoing secretary (now your vice president).

My final thanks go to Tom Grace for his two years of presidential stewardship, his patience and good cheer. He now will continue to serve as our Past President and Parliamentarian, keeping both the board and its new president in line.

Enjoy this issue.

Jordan Star's Web Picks

★ = poor, ★★ = fair, ★★★ = good,
★★★★ = excellent, ★★★★★ = outstanding.

★★★ Micro shells Homepage: http://www.bigai.ne.jp/index.html Bilingual site, requires Internet Explorer attracter utility for full site use. Good search engine with resulting large images. Probably deserves a higher rating, but I'm a little afraid to download what I don't really need and will not use again.

★★★★ Of Sea & Shore Online, http://www.ofseaandshore.com/ Interesting site with a fun shell game. Free web hosting for collectors. Hosting for a commercial site. Site could benefit from having pictures of museum, I was there, pictures say a lot. Can order books and publications on line. A fair links page.

★★★★ SEASHELL-COLLECTOR.com, http://www.seashell-collector.com/ Many links, poor (small) pictures. Much information on storing collections, cleaning, etc. A nice start to shell collecting. Check it out!

★★★★ Academy of Natural Sciences in Philadelphia, PA – Malacology and Invertebrate Paleontology, http://erato.acnatsci.org/. Lots and lots of information. Needs more pictures. A research site with lots of links. Jumping off point to the Academy of Natural Sciences Museum and other sites.

★★★★ MOLLUSKS- The types of seashells you might find at the beach, http://www.seashells.org/identcatagories/mollusks.htm. This may be a repeat review. Pictures fair, knowledge of common names are helpful but not necessary. Links to cleaning, preserving, beachcombing, and of course identifying. A beach stroller's guide to what you might find.

Links good as of 7-8-04

Front cover: *Harpa major* form *conoidalis* from Hawaii. See also page 12. The 60mm shell is superimposed over a detailed image of the shell structure.

Back cover: *Thyca crystallina* (Gould, 1846), a common parasite on the blue sea star, *Linckia laevigata* (Linnaeus). In life this sea star is bright blue and commonly imported for the aquarium trade, although it does poorly unless furnished with a spacious tank where it can freely graze on diatoms and algae.

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CLEAN OUT YOUR DRAWERS....CLOSETS....ETC.

The 2004 COA auction did NOT yield as much as we hoped! We need your help! We need to do much better for COA 2005! The money we raise goes toward GRANTS for molluscan research.

Your tax-deductible donations for both the silent auctions and oral auction is greatly appreciated. I know EVERY COA member should be able to dig up something. We will take shells, old books, anything shell-related, cleaning tools, dive gear, etc. etc. We especially want some really NICE specimen shells with full data for the oral auction. Your duplicate shell might be just what is missing from another's collection.

Send all donations to Jim and Bobbi Cordy, 385 Needle Blvd., Merritt Island, Florida 32953. (321) 452-5736 corshell@earthlink.net We will send you a tax-deductible receipt immediately!

The genus *Harpa* revisited

by

Moshe Erlendur Okon

I gratefully dedicate this article to Harpa and the other teachers at Austerborg playschool in Reykjavik.

Introduction & Systematics

Any amateur shell collector will recognize a harp shell. The shape, pattern, and colors of these beautiful natural objects sets them apart from other molluscs. Every general seashell identification guide depicts most of the species in this genus (*Compendium of Seashells*, for instance and *Muschelen und Schnecken der Weltmeere*), and in the more artistic conchology books one can find an assortment of harps photographed from their best angles (e.g. *The World's Most Beautiful Seashells*).

Yet not all that much is known regarding this genus. What is known has been summed up several times by different authors (Ubaldi (1986, 1990), Frydman (1990), Berkhout (1992), Poppe, Brulet & Dance (1999)). The purpose of this article is to present this information to readers who may not have access to all of the sources used, and to illustrate some of the delightful specimens in the collections of *Harpa* enthusiasts.

The most comprehensive recently written monograph on the family Harpidae is the one by Harald Rehder from 1973. In this work the genera (fossil and Recent) within the family Harpidae are discussed (excluding *Morum* Röding, 1798, which was then placed in Cassidae), each species is illustrated with identification characteristics, and a 'new' species (*H. kajiyamai*) is described. Several photos and illustrations from this work have been used in later works.

The genus *Harpa* Röding, 1798 (together with *Austroharpa* and *Morum*) is one of three Recent genera in the family Harpidae (class Gastropoda, subclass Prosobranchia, order Neogastropoda, superfamily Muricoidea). Fossil records date back to the Paleocene (about 60 million years ago). The name *Harpa* was used by Rumphius as early as 1705 due to the resemblance he saw in the shells to the stringed musical instrument (Fig. 1).

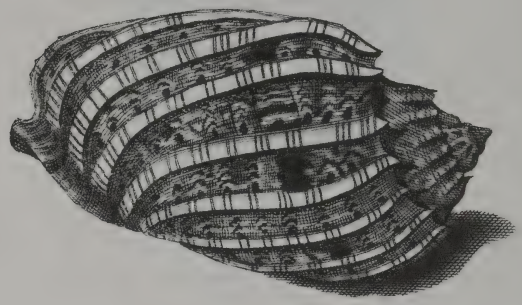
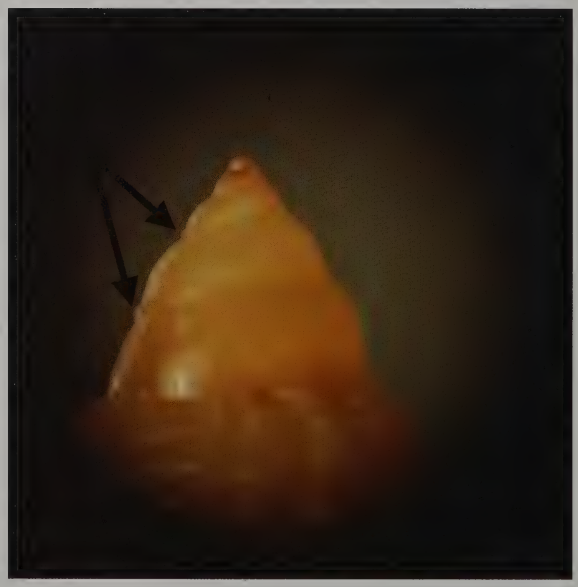


Fig. 1. (above) Rumphius was the first to use the name *Harpa* in 1705 and illustrated the shell that is now *Harpa harpa* (Linnaeus, 1758). This is the illustration referenced by Linnaeus in his initial description of this species.

Fig. 2. (below) Protoconch (3mm x 12.5) of *H. kajiyamai* with medial keel clearly visible (arrows) (coll. M.E. Okon).



Biology & Natural History

The egg capsule laid by a female harp can contain as many as 4,000 eggs. The young develop from free-swimming planktonic larvae (veligers) that eventually settle down on the sea bottom. They form a protoconch of three to four whorls and then a teleoconch of another three to four whorls, the last one being large and inflated. The protoconch possesses a medial keel (Fig. 2).

Varices (ribs) are present at evenly spaced intervals, forming shoulder spines and flattening out into a fasciole at the anterior end. Some mature specimens (mainly *H. crenata, H. doris* and *H. harpa*) display spine-like denticulate protrusions on the outer lip. The size of adult harps can range from 20-120mm.

There is an anterior notch for the siphon, no umbilicus (apart from a very shallow one in *H. gracilis*), no operculum and no discernable periostracum. There does not seem to be sexual dimorphism and no sinistral specimens are known. The radula of harp shells is small and does not continue to grow with the animal. For details of the digestive system see Hughes & Emerson (1987).

Harp shells generally live in deep offshore waters on sandy or silty bottoms. *H. major* and *H. costata* have been collected by divers and three species can be found in shallower waters (*H.*

amouretta, H. cabriti and *H. gracilis*). *Harpa* inhabit the tropical Indo-Pacific as well as the eastern coast of the Pacific (*H. crenata*) and the eastern coast of the Atlantic (*H. doris*). They are consumed as food in the Far East.

The animal, no less colorful than its shell, is characterized by a very large propodial shield (foot) that serves several purposes. The animal can use it to quickly glide over the sandy bottom and rapidly burrow when necessary.

When disturbed, the tip of the metapodium (back lobe of the foot) can be autotomized (voluntarily severed) (Figs. 3 & 4). Stasek (1967) voices the opinion that, in Mollusca, the vast majority of autotomy instances have evasive qualities. Indeed, it is widely believed that the harp's ability to autotomize is a way of deflecting predators. Hardy (1972), however, gives an account of autotomy he witnessed, saying that during the process the mollusk is immobile, extended out of its shell, and is therefore even more vulnerable. Berkhout (1992) states that the autotomized part is later regenerated, though there seems to be no direct evidence of this. There is, however, a report of *Ficus ficus* (L., 1758) regenerating autotomized mantle tissue within one week (Liu & Wang, 1996).

Harps are carnivorous and feed mainly on small crustaceans. Their method of capturing shrimp or crabs is rather complex. The animal holds its prey down with the propodium (front lobe of the foot) and then brings the metapodium under the prey to completely engulf it. Copious amounts of mucus are secreted to paralyze the prey and it is then consumed, possibly by first liquefying it, and then sucking it in.

Fig. 3. (above) A sketch of a live *H. cabriti* and the ventral view of the propodial shield with an autotomized metapodium. Quoy & Gaimard, 1833, pl. 42.

Fig. 4. (below) The well-known image of *H. major* from the Marquesas performing autotomy. Photo by Otis Imboden, National Geographic Society, from Rehder, 1973.

How the Shell is Formed

It is highly unusual to find a harp shell in which the outer lip is not varicated, but rather in a state between the last varix laid and the one yet to come. This is not unique to *Harpa*, but seems to be the rule with all gastropods that form varices at regular intervals of coiling. Linsley and Javidpour (1980) examined several species in the genera *Cassis*, *Cymatium*, *Distorsio*, *Biplex* and *Phyllonotus*. They concluded that in varicated shells the growth is episodical rather than continuous.

While expanding the shell from one varix to the next, the mollusk is at higher risk of predation than usual, primarily because of the animal's need to extend itself and its mantle out of the aperture to lay the new shell layers. If we think of a *Biplex* shell, the state of being in between varices is highly dysfunctional: the spire of the shell would point upward rather that lie close to the surface. This would enable potential predators to use the spire as a lever to turn the shell over and expose the aperture and animal.

The practical nonexistence of shells with the outer lip unvaricated and the potential dangers mentioned can lead us to assume that harp shells grow from one varix to the next in one spurt and hide by burrowing in the sand during this process. Up until now, however, this has not been documented, so we do not know whether the animal feeds excessively beforehand in order to accumulate enough calcium to lay the aragonite layers, how long the process of adding a varix takes, whether more than one varix may be added in one spurt, and how long the animal waits before beginning the next growth stage.

Robertson (1983) conducted studies on the growth of *Epitonium* shells (varix-bearing as well). He found that these mollusks add one varix at a time (occasionally two), first a thin layer and later thickened. The question of what accounts for the rhythmic growth of the *Epitonium* shells (day and night alternations, tides, rhythmic feeding, endogenous cycle?) is not answered by the data collected, but a hypothesis is raised that unusually closely spaced varices are the result of lack of food during the growth period in which the varices were added.

Linsley and Javidpour (1980) found in varix-bearing shells the aragonite layers in new shell additions are applied parallel to the shell surface, beginning with the outer periostracum and then the

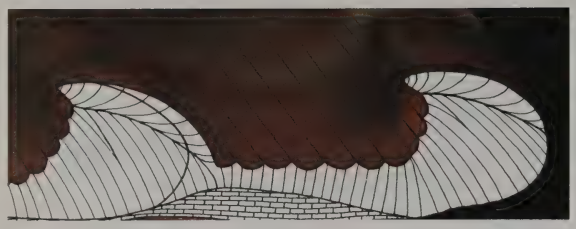


Fig. 5. Two layers of shell material in the intervarix space. The inner surface is porcellaneous and its layers are parallel to the shell surface; the outer surface is prismatic and made up of perpendicular columns. Diagram based on J. Berkhout.

inner layers. In harp shells the geometry is a bit more complex, as described by Berkhout (1992). In the intervarix space, there are two layers of shell material. The inner one is porcellaneous and its layers are parallel to the shell surface. The outer layer is prismatic and made up of perpendicular columns. One can see and feel the difference on the inner surface of a harp shell's outer lip. When a new varix is formed, the columns become longer and bend away from the aperture. Finally, the mantle fold is completely deflected and the columns become short and their direction reversed (Fig. 5).

The pattern of harp shells is more or less similar in all species, but varies in color. There are two alternating patterns: one of spiral bands and thin dark lines on the varices (sometimes two varices fuse into a wider one, Fig.6), and the other, between varices, of both spiral bands with occasional dark square blotches and wavy dark and light axial lines or bands that form chevrons and arrowheads. The shiny ventral glaze can have one, two, or three dark blotches.

Species Count & Controversy

Harpologists will agree to a minimal number of eight species, but some claim eleven, twelve and so on. Harp shells are extremely polymorphic. The variability displayed within the species *H. major*, for instance, has led to the naming of several synonyms: *H. vulgaris* Schumacher, 1817; *H. conoidalis* Lamarck, 1822; *H. ligata* Menke, 1828; *H. nobilis* Lamarck, 1835; *H. kawamurai* Habe in Habe & Kosuge, 1970; etc. Some of these names are still used today, not always to designate a species, but rather to identify certain forms.

It is interesting to note that despite the great inter- and intra-specific variability, new species, subspecies, or forms have hardly been named in the past years. The most recent attempt to describe a harp shell is by Orga (1998) who refers to a specimen out of an old collection, supposedly collected in 1937 in Brava, South Somalia. Orga named the species *H. fulvomichaelensis*, after two people, not a location. The single specimen is depicted in black and white. It is 35mm long and was live taken. It is difficult to say whether this is indeed a new species. It could be a variant of previously known species from Somalia or the data may be in error.

Identification of harp shells can be based on several parameters. The following guidelines are not meant to be a substitute for referring to original descriptions, but rather to help narrow down possibilities when faced with an unidentified harp. Atypical shells (which are, actually, rather typical in this genus) can pose real difficulties to even well trained experts and sometimes possess characteristics of two or three species.

Fig. 6. *H. major*, 111mm, Philippines. Notice the fused varices (coll. M.E. Okon).

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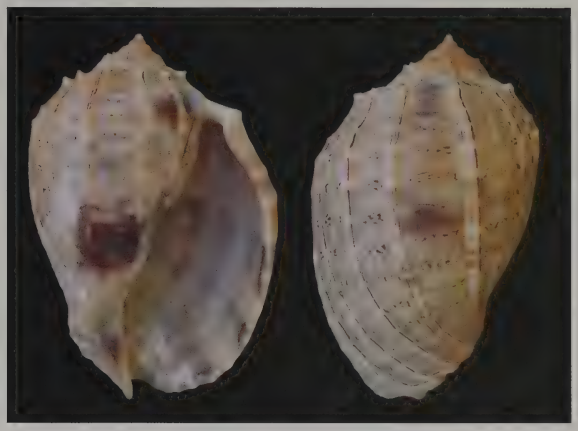
Location will safely single out two similar and related species: *H. crenata* and *H. doris*.

***H. crenata* 54mm; off Cebaco Island, Panama (coll. M.E. Okon).**



***H. crenata* 76mm; dredged at 40 meters on sand, Bay of Chiriqui, Panama (coll. M.E. Okon).**

***Harpa crenata* Swainson, 1822**

This medium-sized harp ranges from the Gulf of California south to the Colombian shores. It is the only harp from these waters. Average specimens are between 40-70mm. Its body whorl is very angular and there are rows of spines on the top of the normally thin varices. The outer lip is denticulate on the anterior part. The general color is beige-brown.

***H. doris* 60mm; trawled in 60 meters of water off Guinea, west Africa (coll. & photo, Tom Eichhorst).**

***H. doris* 50mm; São Vicente Island, Cape Verde – heavier, broader form (coll. & photo, Tom Eichhorst).**

***Harpa doris* Röding, 1798**

This medium-sized harp ranges from the Cape Verde Islands south to Angola and Ascension Island. It is the only harp from these waters. Average specimens are between 40-65mm. Its body whorl is angular. The outer lip is strongly denticulate on the anterior part. The general color is pinkish-red.

There is a smaller, broader, heavier, and less colorful form of *H. doris* that can be found around the offshore islands. Poppe, Brulet & Dance (1999) call this forma *robusta*, but there is no official description of it, so it is not clear where the name originated.

The protoconch will help with a third species: *H. gracilis*.

***H. gracilis* 22mm; on reef at low tide, Arutua Atoll, Tuamotu (coll. & photo, M.E. Okon).**

***H. gracilis* 21.7mm; Marquesas Islands, (coll. & photo, Travis Payne, courtesy of R. Goldberg, worldwideconchology.com)**

***Harpa gracilis* Broderip & Sowerby, 1829**

This is the smallest harp with adult shells reaching between 20-35mm. It is the only harp with a white protoconch, clearly distinguishing it from all other harps, whose protoconchs are pink to brown. Other differentiating characteristics are the shallow umbilicus, slender form, and no shoulder on the body whorl. It is restricted to the East Pacific (Ellice Islands, the Tuamotus, and Clipperton) and is a shallow-water dweller rarely found in private collections.

A fourth, unmistakable species is *H. costata*.

***H. costata* 56mm; dived at 15 meters, Mauritius (coll. & photo, M.E. Okon).**

***H. costata* 45mm; Rodriguez Island, forma *laetifica* (coll. & photo, Franck Frydman).**

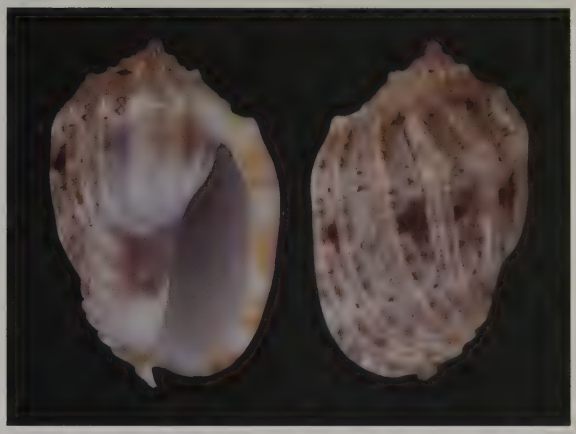
***Harpa costata* (Linnaeus, 1758)**

The unique characteristic of this medium- to large-sized harp is the comparatively large number of varices, occasionally more than 40 on the body whorl. They are set close together and the shell is very broad. The animal is a shallow-water dweller and the species is restricted to the East Indian Ocean islands of Mauritius, Reunion, Comoros and northern Madagascar. The pattern consists mainly of light and dark spiral bands on the varices. Average specimens are between 50-80mm.

The color of the ventral glaze and aperture is yellowish and there are usually two brown blotches on the parietal glaze, one at the suture and the other at the middle of the columella. A third, smaller brown blotch at the tip of the columella may also be present. Sometimes there is a less developed varix in between each two well-developed ones. These shells are named forma *laetifica* and are very uncommon.

Shape, pattern, color, and the the dark blotches on the ventral glaze single out another three: *H. amouretta*, *H. harpa*, and *H. kajiyamai*.

***H. amouretta* 62mm; Philippines, larger than normal specimen (coll. & photo, M.E. Okon).**

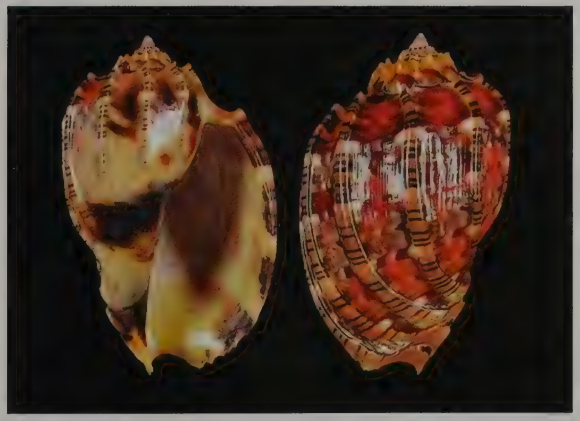


***H. amouretta* 30mm; Jeddah, Saudi Arabia, forma *crassa*, notice broader shell and thicker lip (coll. & photo, M.E. Okon).**

***Harpa amouretta* Röding, 1798**

This small harp is one of the most variable. It can be found throughout the Indo-Pacific region (East Africa to the Marquesas), as well as in the Red Sea. Average specimens are between 30-50mm. The protoconch is pink to dark purple and the shell is rather slender. There are numerous dark spiral lines on the varices, occasional brown squares between varices, and a main dark blotch at the center of the parietal glaze (one or two other blotches may also be present).

Forma *crassa* of *H. amouretta* is thicker, broader and heavier, and normally displays lighter shades. The thickness can clearly be seen at the outer lip. This form is predominant in the Red Sea and common off east Africa, although reports of this form have been given throughout the distribution of *H. amouretta*.



***H. harpa* 53mm; red form found between 15-30 meters on the slopes of Olango and Caubian Islands, Philippines (coll. & photo, Guido & Philippe Poppe, Conchology, Inc.).**

***H. harpa* 66mm; Philippines (coll. & photo, M.E. Okon).**

***Harpa harpa* (Linnaeus, 1758)**

This medium-sized harp is the type species for the genus. Buonanni first illustrated the shell in 1681 and his illustration was used by Linnaeus who named the shell *Buccinum harpa*. Its distribution is centered in the Western Pacific, although there are findings as far west as East Africa and the Red Sea. Average specimens are between 50-70mm. The shells are generally angulate at the shoulder and have flat varices with many spiral dark lines, usually in groups of three or four.

There are three separate dark blotches on the parietal glaze. The outer lip is thick and denticulate at the anterior. Although the shell's shape and pattern are rather consistent, color can vary considerably. There are dark shells as well as light-colored shells. White, pink, purple, red, brown and orange *H. harpa* are known. In some specimens there are dark squares between the varices at different intervals.

H. kajiyamai **44mm; Philippines (photo Korina Sangiouloglou, coll. George Sangiouloglou, http://www.george-shells.com).**

H. kajiyamai **43mm; Balut Is., Philippines (coll. & photo, Tom Eichhorst).**

Harpa kajiyamai **Habe in Habe & Kosuge, 1970**

This harp is small- to medium-sized with an average size of 45-55mm. Its range is restricted to the Southern Philippines. There are reports of findings in Japan, and Poppe, Brulet & Dance (1999), illustrate specimens from India and Somalia, but these reports are in need of further investigation. The shape of *H. kajiyamai* can be slender or broad, but the outer lip is never denticulate and there are usually only two blotches on the thin parietal glaze, at the anterior end and in the middle.

This species is usually attributed to Rehder, 1973. However, as Frydman (2000) shows, Rehder (1973) himself refers to the species that Habe had already described and given the provisional name '*kajiyamai*' in Habe & Kosuge (1970). Rehder's 1973 '*kajiyamai*' is, therefore, a junior synonym and homonym. Walls (1980) considers *H. kajiyamai* to be synonymous with *H. harpa*.

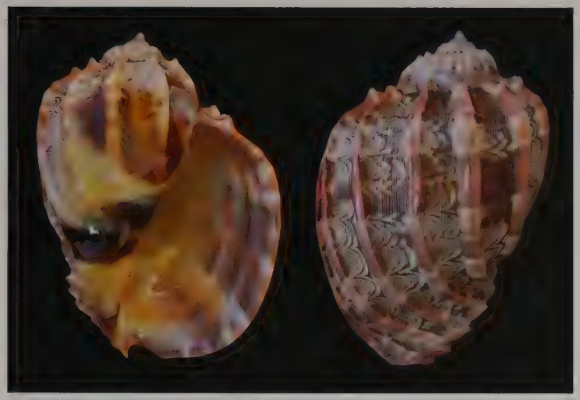
The remaining species are very similar and some overlap in distribution. A combination of all of the above identification parameters and a good amount of experience will help identify them. Walls (1977) refers mainly to parietal blotches and the spiral band formation on the outer lip to differentiate between these species: *H. articularis*, *H. cabriti*, *H. davidis* and *H. major*.

H. articularis **84mm; no data (coll. M.E. Okon).**

H. articularis **86mm; no data (coll. M.E. Okon).**

Harpa articularis **Lamarck, 1822**

This large harp is limited in its distribution to the Pacific Ocean between Indonesia and Fiji. Average specimens are between 65-85mm. This species never displays dark squares between the varices and the parietal glaze is normally covered by one large dark blotch. In other aspects (color, pattern, width of varices), it is quite variable. There is at least one known albino specimen of this species; a solid white, 94mm specimen trawled from 80 fathoms off south Maspate Island, Philippines, owned by Fred Leonard of North Carolina.0



H. cabriti **82mm; Tulear, Madagascar (coll. M.E. Okon).**

H. cabriti **79mm; Inhambane, Mozambique (coll. M.E. Okon).**

***Harpa cabriti* Fischer, 1860**

This large and heavy harp is restricted to East Africa. Average specimens are between 60-90mm. The general shape of the shell is square and there are no dark spiral lines present on the varices. There are three dark blotches on the parietal glaze, the anterior one is sometimes connected to the middle one by a dark line along the columella. The general colors are reddish shades.

H. ventricosa Lamarck, 1816 is a synonym of *H. cabriti* according to Rehder (1992). This is an interesting case, because the shell described by Lamarck in 1816 is indeed the same species as *H. cabriti* and the name *ventricosa* would theoretically have precedence since it is earlier. However, Lamarck himself used the name *ventricosa* in 1801 to describe a shell that was actually *H. major*. So the name *ventricosa* was unavailable in 1816 (a junior homonym but not synonym).

H. davidis **70mm; taken by fishermen off Colombo, Sri Lanka, notice rounded body whorl (coll. M.E. Okon).**

H. davidis **48mm; no data (coll. M.E. Okon).**

***Harpa davidis* Röding, 1798**

This medium-large harp is restricted to the Maldive Islands and the Andaman Sea. Average specimens are between 55-75mm. Its shape is rounded and the general color is light brown. Dark spiral lines on the varices may be present. There are three blotches on the parietal glaze, the posterior one and the middle one are sometimes connected along the columella. This is one of the more often misidentified harps, with specimens (typically *Harpa major*) from well outside the normal range of this species sold as *Harpa davidis*. Some of this confusion is undoubtedly due to Walls (1980) who split this species into three variations: the typical *Harpa davidis*, a variation *major* (Röding) and a variation *ventricosa* (Lamarck). One (*H. major*) is now a distinct species and the other (*H. ventricosa*) a synonym.

***H. major* 34mm; dredged in 10meters, white sand, Coral Sea, Australia; the small white form (coll. & photo, Emilio Jorge Power).**

***H. major* 76mm; Philippines – notice wide varices (coll. & photo, M.E. Okon).**

***Harpa major* Röding, 1798**

This large harp is a major challenge to Harpologists. It is the most variable in every aspect: size, spire and body shape, number of varices and their width, color, pattern, and distribution. The only consistent feature, more or less, is the arrangement of the parietal blotches. There are normally two large dark blotches, one at the suture and one extending from the middle of the columella down to the anterior tip. These two blotches are usually connected to some extent, either on the columella or half way through their length.

H. major can be found throughout the Indo Pacific region, from East Africa to the Hawaiian and Marquesas Islands. Specimens range in size from 40-120mm. Although shells from certain areas seem to possess constant characteristics, it is possible to find most forms in most locations, rendering the designation of subspecies a difficult task. The so-called forma *kawamurai*, according to Poppe (pers. comm.), is merely a term for all unusual specimens from the Philippines. Deep-water shells from Hawaii are called *H. conoidalis*, but there do not seem to be differentiating characteristics to warrant a subspecies or even a form.

***H. major* form *conoidalis*, 60mm; found in trap at 80 meters, Haleiwa, Oahu, Hawaii (coll. & photo, Tom Eichhorst).**

A final taxon in need of discussion is *goodwini*.

***Harpa goodwini* Rehder, 1993**

This harp is the rarest of all and there are not many specimens that can readily be examined. It is most often found crabbed in lobster traps at depths of 80-230 meters. The 13 specimens Rehder examined ranged from about 60-75mm in length and 40-60mm in width. It is a broad shell colored pink to orange with the spire whorls appearing to be yellowish due to the glaze covering.

There are eight pairs of dark spiral lines crossing the ribs. Orange squares may be present between the varices on the body whorl, and there are sometimes two spiral bands, one in the middle of the whorl and the other below the shoulder. There are three dark blotches on the parietal glaze.

In his description, Rehder claims this species most resembles *H. cabriti* (and then *H. costata* in outline), but Chris Takahashi (pers. comm.) claims Rehder had previously come to the conclusion that this taxon was actually a northern extension of the range of *H. kajiyamai*! Why Rehder did not mention *H. kajiyamai* in his description is unknown. Frydman (pers. comm.) believes *H. goodwini* is indeed synonymous with *H. kajiyamai*, and see also Frydman (1991).

I am thankful to the many who assisted me in preparing this article, especially to Franck Frydman for advice, images and conversation. The images of the harps in my collection were done by me, those of harps in other collections were done by the owners of those specimens.

Moshe Erlendur Okon P.O.Box 7803, 91077 Jerusalem, Israel. E-mail: erlend@netvision.net.il

***'H. goodwini'* 66mm; crabbed in lobster trap at 120 meters, Waimea Bay, north Oahu, Hawaii (coll. & photo, M.E. Okon).**

***'H. goodwini'* 68mm; lobster trap at 350 meters, Oahu, Hawaii (shell and photo, Travis Payne from worldwideconchology.com).**

COA Grants for 2004

The Grants Committee for 2004 consists of Dr. Henry Chaney (Santa Barbara Museum of Natural History), Dr. José Leal (Bailey-Matthews Shell Museum) and Dr. Gary Rosenberg (The Academy of Natural Sciences of Philadelphia), with Dr. Leal as chair. This year, we received 27grant applications requesting a total of $35,074.00. Of the 27applications, 6 came from professionals and 21 came from students.

The eleven recommended proposals for funding came to a total of $14,583.00, subsequently approved by the COA Board of Directors. The Grants Committee nominated the proposal by Eric D. Crandall, a Boston University Marine Program student, for the Walter Sage Award. This decision was based on the project's originality, the wide-ranging reach of its potential results, and the use of modern techniques of DNA sequencing to answer longstanding questions in the fields of marine ecology and biogeography.

A complete list of grantees may be viewed on the COA web site: http://coa.acnatsci.org/conchnet/

Crandall, Eric D., $1,470, Boston University Marine Program, How do "stepping-stones" of available habitat affect genetic connectivity in neritid snails?

Dietl, Gregory P., $1,100, University of North Carolina at Wilmington, Evolution of *Strombus alatus* species complex following a post-Pliocene productivity decline in Florida.

Faucci, Anuschka, $1,025, University of Hawaii at Manoa, The origin of Hawaiian vermetids.

Hayes, Kenneth, $1,500, University of Hawaii at Manoa, Systematics, phylogeography and evolution of apple snails (*Pomacea* spp,)

Holland, Brenden, $1,500, University of Hawaii at Manoa, Biogeography of a widely distributed land snail famil: Coloniozation pathways, evolutionary patterns and systematics of Pacific Island Succineidae.

Hoverman, Jason, $1,300 University of Pittsburgh, The evolution of phenotypic plasticity in freshwater snails.

Li, Wei, $1,317, Tufts University, Detecting inbreeding in marine slippershell snails *Crepidula fornicata* and *Crepidula convexa*.

Przeslawski, Rachel, $1,000, Flinders University of S. Australia, The role of marine chemical sunscreens in encapsulated molluscan development.

Spooner, Daniel, $1,500, The University of Oklahoma, An integrative approach to understanding freshwater mussel (Family: Unionidae) community structure: Linking biodiversity, environmental context and physiology.

Untersee, Steve, $1,400, Tufts University, Differences in copper toxicity in 2 closely related species of marine gastropod with different modes of reproduction.

Whalen, Kristen, $1,476, Woods Hole Oceanographic Institution, Detoxification and transport of dietary metabolites in marine mollusks.

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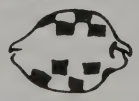

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Lambis

Lambis adamii Bozzetti & Cossignani, 2003, 65mm, P.I.

Lambis chiragra arthritica Röding, 1798, 143mm, Mauritius

Lambis chiragra chiragra (Linnaeus, 1758), 225mm, P.I.

Lambis crocata crocata (Link, 1807), 112mm, P.I.

Lambis crocata pilsbryi Abbott, 1961, 173mm, Marquesas

*Lambis digitata (*Perry, 1811), 138mm, Madagascar

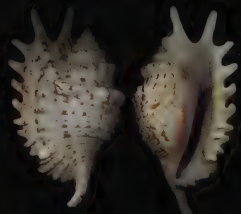
Lambis lambis (Linnaeus, 1758), 172mm, Zanzibar

Lambis millepeda (Linnaeus, 1758), 121mm, P.I.

Lambis robusta (Swainson, 1821) 138mm, Tahiti

Lambis scorpius scorpius (Linnaeus, 1758), 163mm, P.I.

Lambis scorpius indomaris Abbott, 1961, 160mm, Tuléar



Lambis violacea (Swainson, 1821), 105mm, Maritius

Lambis truncata truncata (Humphrey, 1786), 312mm, India

Lambis wheelwrighti Greene, 1978, (*L. truncata* x *L. millepeda*), 200mm, P.I.

Lambis truncata sebae (Kiener, 1843), 300mm, Micronesia

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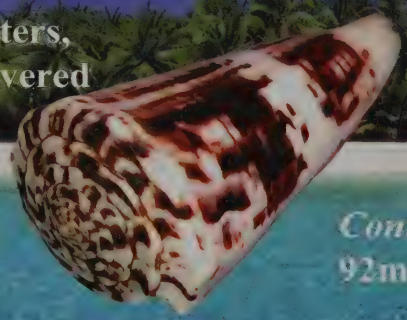

Conus tribblei Walls, 1977
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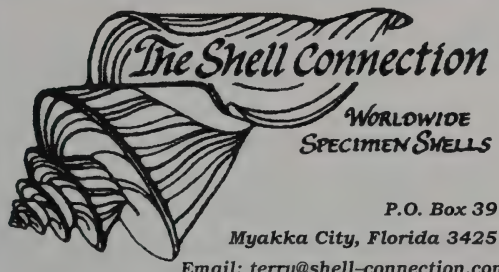

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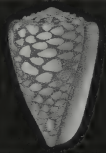

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Report on the malacofauna of offshore Louisiana waters - including many range extensions and unnamed species, III

E. F. García and H. G. Lee

In earlier reports on molluscan species found in offshore Louisiana waters we listed (García & Lee, 2002), and in many cases illustrated (García & Lee, 2003), 385 species-level taxa, many of which were extensions of known range and unnamed species. In July 2003, another collecting expedition on the "Pelican," the research vessel belonging to the Louisiana Universities Marine Consortium, added another 75 species-level taxa, producing again a number of new records for the Gulf of Mexico, as well as several apparently undescribed species. This, in spite of the fact that there were only four collecting days, which included many hours of travel time.

The first stop of the expedition was at one of the hydrocarbon vents that exist on the continental slope off the Louisiana shores. The unique ecology of these vents (see García, 2003) has produced a rich habitat for mollusks. But, these "oases," as they have been called, are inhabited by a fauna that survives on chemosynthesis, and does not extend very far from the actual vents. The seafloor that surrounds this narrow strip is an almost completely sterile desert of soft mud. As we were using a box-core grab to collect the specimens, and since the floor depth was between 587 and 680 m, it was a difficult task indeed to get the small box in the producing area, taking into account the length of the cable and the Gulf currents.

We did not succeed in reaching the target area of living organisms. But, twice we were close enough to the vents to bring up a box-full of sediment from which the surprising number of 22 species of mollusks was extracted. Some of the species had been found elsewhere off the Louisiana coast and were obviously transient species, while others, such as *Cantrainea macleani* Warén & Bouchet, 1993, had been found in hydrocarbon vents in earlier expeditions. We were unable to identify 10 of the 22 species extracted from the sediment. Moreover, *Gymnobela blakeana* (Dall, 1889) and *Volutomitra bairdii* Dall, 1909 had not been reported from the Gulf of Mexico, and *Dentimargo fusinus* (Dall, 1881) and *Benthomangelia antonia* (Dall, 1881) had been reported only from the Yucatán Strait. As none of the species was collected alive, there is a possibility that some of newly recorded species may also be transient.

The second portion of the trip was used to dredge on top of the salt domes, or "pinnacles," that exist in the waters off the Louisiana coast (see García & Lee, 2002). Once again, we were surprised by the species collected there. Among the more salient findings are *Mirachelus clinocnemus* Quinn, 1979, *Bursa corrugata* (G. Perry, 1811), *Cirsotrema pilsbryi* (McGinty, 1940), *Opalia abbotti* Clench & Turner, 1952, *Spirolaxis centrifuga* (Monterosato, 1890), and *Benthonellania xanthias* (*Watson, 1886*). None of these species have been reported from the Gulf of Mexico, and the latter has been reported only from Puerto Rico, the eastern Caribbean island of Guadeloupe, and Brazil. Also, a surprising habitat for a fissurellid was discovered in one of the dredge hauls. Dr. Darryl Felder, looking for burying decapods, was cutting up a hard sponge that had come up in the dredge when he handed a live specimen to the first author of what later was identified as *Emarginula tuberculosa* Libassi, 1859. It had been extracted from the center of the sponge, together with many small crustaceans.

As the vessel came closer to shore, we dredged at two other stations, in a muddy bottom. All species collected during the July 2003 expedition that had not been collected before are listed below in systematic order.

The following abbreviations will be used for previously unreported geographical distributions and habitats:

GOM- Previously unreported from the Gulf of Mexico
N. GOM- Previously unreported from the northern Gulf of Mexico
NW. GOM- Previously unreported from the northwestern Gulf of Mexico
LA- Previously unreported from Louisiana.
(H)- Hydrocarbon vents- 587- 680 m.
(SD)- Salt domes- calcareous rubble, 60- 100 m.
(M)- Mud bottom, 20- 30 m.

1-*Solemya* species- 15mm-(H)
2-*Nucinella* species- 2.7mm-GOM (SD)
3-*Aequipecten phrygius* (Dall, 1886) (SD)
4-*Dendostrea frons* (Linnaeus, 1758) (SD)
5-*Lucina* aff. *sombrerensis* Dall, 1886- 8mm-GOM (SD)
6-?*Parvilucina* species- 13 mm-GOM (SD)
7-*Thyasira trisinuata* (d'Orbigny, 1842)- 10mm-(H)
8-*Macoma extenuata* Dall, 1900- 9.1mm-(SD)
9-*Strigilla surinamensis* Boss, 1972 (M)
10-*Abra aequalis* (Say, 1822)-(SD)
11-*Solecurtus cumingianus* Dunker, 1861
12-*Vesicomya* cf. *pilula* (Dall, 1881)- 2.2mm- GOM (H)
13-*Vesicomya* species- 14 mm- GOM (H)
14-*Vesicomya venusta* (Dall 1885)- 4.6mm-(H)
15-*Cyclinella tenuis* (Récluz, 1852) (M)
16-*Haliris fischeriana* (Dall, 1881)- 4.5mm-(SD)
17-*Trigonulina ornata* (d'Orbigny 1842) –(SD)
18-*Cuspidaria jeffreysi* (Dall, 1881) –7.9mm-(SD)
19-*Myonera lamellifera* (Dall, 1881) – 5.7mm-(SD)
20-*Antalis* cf. *occidentale* (Stimpson, 1851- GOM (H)
21-*Antalis taphria* (Dall, 1889)-9.5mm
22-*Episiphon sowerbyi* (Guilding, 1838) -(M)
23-*Graptacme eborea* Conrad, 1846-(SD)

24-*Siphonodentalium* cf. *lobatum* G.B.Sowerby II, 1860- 11.5mm-GOM (H)
25-*Anatoma proxima* (Dall, 1927)- 2.8mm-LA (SD)
26-*Arene tricarinata* (Stearns, 1872)-LA (SD)
27-*Eulithidium thalassicola* (Robertson, 1958)- 2.1mm-NW GOM (SD)
28-*Lamellitrochus* cf. *lamellosus* Verrill & Smith, 1880- 6.5mm-GOM (H)
29-*Mirachelus clinocnemus* Quinn, 1979- 3.0mm-GOM (SD)
30-*Solariella lacunella* (Dall, l881)- 8mm- NW GOM (SD)
31-*Calliostoma fascinans* Schwengel & McGinty, 1942-NW GOM (SD)
32-*Plesiothyreus hamillei* (P. Fischer, 1857- 6mm-N. GOM (SD)
33-*Finella dubia* (d'Orbigny, 1840)- NW GOM (SD)
34- *Modulus modulus* (Linnaeus, 1758) (SD)
35-*Benthonellania xanthias* (Watson, 1886)- 1.5mm- GOM (SD)
36-*Cyclostremiscus pentagonus* (Gabb, 1873) (SD)
37-*Episcynia inornata* (d'Orbigny, 1842)- 2.1mm- LA (SD)
38-*Parviturboides interruptus* (C. B. Adams, 1850)- 1.5mm-LA (SD)
39-*Solariorbis* species- 2.9 mm- GOM (H)
40-*Strombus alatus* Gmelin, 1791-(SD)
41-*Sinum perspectivum* (Say, 1831)- LA (SD)
42-*Cypraecassis testiculus* (Linnaeus, 1758) (SD)
43-*Distorsio clathrata* (Lamarck, 1816) (SD)
44-*Distorsio perdistorta* (Fulton, 1838)- NW GOM (SD)
45-*Bursa corrugata* (G. Perry, 1811)- N. GOM (SD)
46-*Cirsotrema pilsbryi* (McGinty, 1940)- 8.4mm-GOM (SD)
47-*Opalia abbotti* Clench & Turner, 1952- 3.4mm-GOM (SD)
48-*Aclis* cf. *hendersoni* Dall, 1927- 2.0 mm-LA (SD)
49-*Phyllonotus pomum* (Gmelin, 1791)-LA (SD)
50-*Fasciolaria tulipa* (Linnaeus, 1758) (SD)
51-*Costoanachis* species- 8.4 mm- GOM (H)
52-*Dentimargo fusinus* (Dall, 1881)- 5mm- N.GOM (H)
53-*Volutomitra bairdii* Dall, 1889- 24.6mm-N. GOM (H)
54-*Trigonostoma tenerum* (Philippi,1848)- 14.5mm-NW GOM (SD)
55-*Terebra nassula* Dall, 1889-NW GOM (SD)
56-*Conus delessertii* Récluz, 1843- NW GOM (SD)
57-*Bellaspira pentagonalis* (Dall,1889)- 10mm- NW GOM (SD)
58-*Benthomangelia antonia* (Dall 1881)- 15mm-N GOM (H)
59-*Cochlespira radiata* (Dall, 1889) (SD)
60-*Crassispira* species- 18.5mm- GOM (H)
61-*Compsodrillia haliostrephis* (Dall, 1889)- 11mm- NW GOM (SD)
62-*Gymnobela blakeana* (Dall, 1889)- 8mm- GOM (H)
63-*Gymnobela extensa* (Dall, 1881)- 4mm- (H)
64-*Gymnobela* species A- 10mm-GOM (H)
65-*Gymnobela* species B- 8.3mm-GOM (H)
66-*Pleurotomella filifera* (Dall, 1881)- 12mm-(H)
67-*Pleurotomella ipara* (Dall, 1881)-9mm- N.GOM (H)
68-*Polystira* species- 24.7mm- GOM (SD)
69-*Strictispira* species- 14.5mm- GOM (M)
70-*Spirolaxis centrifuga* (Monterosato, 1890)- 3.3mm- GOM (SD)
71-*Fargoa bartschi* (Winkley, 1909)- 2.2mm-LA (SD)
72-*Syrnola* species-2.3mm-GOM (SD)
73-*Pyrunculus caelatus* (Bush, 1885) (SD)
74-*Volvulella persimilis* (Mørch, l873) (SD)
75-*Bulla striata* Bruguière, 1792- LA (SD)

Note: illustrated specimens without a reference number were previously listed in Garcia & Lee, 2002.

Voucher specimens for all listed species are in the García and/or Lee collections. The complete list, with images of many species, can be viewed at http://www.jaxshells.org/efg1030.htm.

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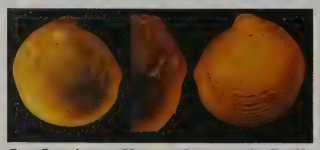
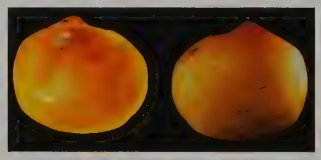
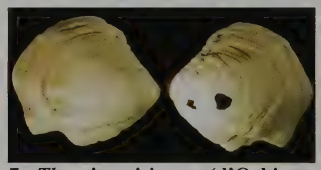
García, E. F. 2002. Unexpected molluscan finds from the hydrocarbon vents off the Louisiana coast. *American Conchologist* 30(4): 28.
García, E. F. and H. G. Lee. 2002. Report on molluscan species found in the offshore waters of Louisiana, including many extensions of known range and un-named species. *American Conchologist* 30(4): 10-13.
García, E. F. and H. G. Lee. 2003. Report on molluscan species found in the offshore waters of Louisiana, including many extensions of known range and un-named species. II. *American Conchologist* 31(1): 26-29.



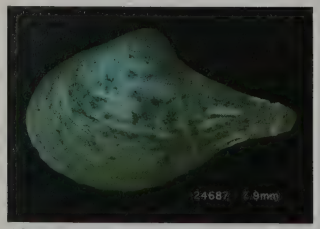
5. *Lucina* aff. *sombrerensis* Dall, 1886, 8mm GOM(SD)



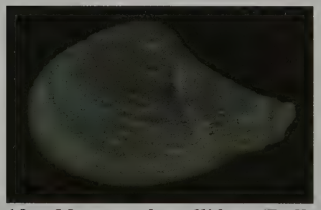
6. *Parvilucina* sp., 13mm GOM(SD)



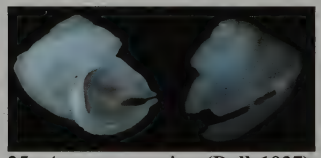
7. *Thyasira trisinuata* (d'Orbigny, 1842), 10mm (H)



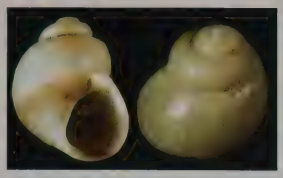
18. *Cuspidaria jeffreysi* (Dall, 1881), 7.9mm (SD)



19. *Myonera lamellifera* (Dall, 1881), 5.7mm (SD)

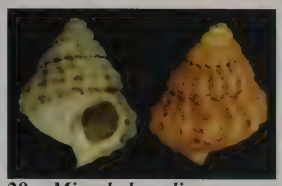


25. *Anatoma proxima* (Dall, 1927), 2.8mm LA(SD)

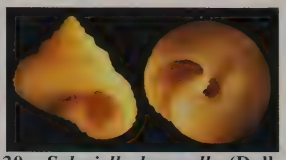


27. *Eulithidium thalassicola* (Robertson, 1958), 2.1mm NW GOM(SD)

28. *Lamellitrochus* cf. *lamellosus* Verrill & Smith, 1880, 6.5mm GOM(H)



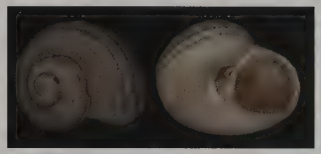
29. *Mirachelus clinocnemus* Quinn, 1979, 3.0mm GOM(SD)



30. *Solariella lacunella* (Dall, 1881), 8mm NW GOM(SD)

35. *Benthonellania xanthias* (Watson, 1886), 1.5mm GOM(SD)

37. *Episcynia inornata* (d'Orbigny, 1842), 2.1mm LA(SD)



38. *Parviturboides interruptus* (C. B. Adams, 1850), 1.5mm LA(SD)

Capulus incurvatus (Gmelin, 1791), 2.5mm, previously covered (Garcia & Lee, 2002).

46. *Cirsotrema pilsbryi* (McGinty, 1940), 8.4mm GOM(SD)

47. *Opalia abbotti* Clench & Turner, 1952, 3.4mm GOM(SD)

48. *Aclis* cf. *hendersoni* Dall, 1927, 2.0mm LA(SD)

51. *Costoanachis* species, 8.4mm GOM(H)

52. *Dentimargo fusinus* (Dall, 1881), 5mm N.GOM (H)

53. *Volutomitra bairdii* Dall, 1809, 24.6mm N.GOM(H)

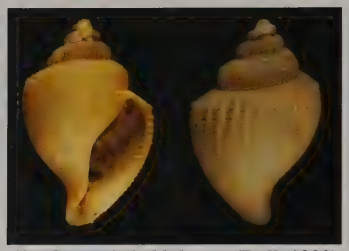
54. *Trigonostoma tenerum* (Philippi,1848), 14.5mm NW GOM (SD)

57. *Bellaspira pentagonalis* (Dall,1889), 10mm NW GOM(SD)

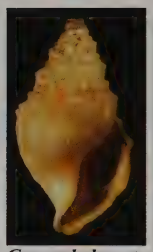
58. *Benthomangelia antonia* (Dall 1881), 15mm N GOM(H)

60. *Crassispira* species, 18.5mm GOM(H)

61. *Compsodrillia haliostrephis* (Dall, 1889), 11mm NW GOM(SD)

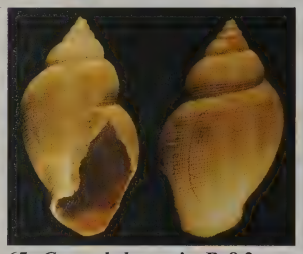


62. *Gymnobela blakeana* (Dall, 1889), 8mm GOM(H)



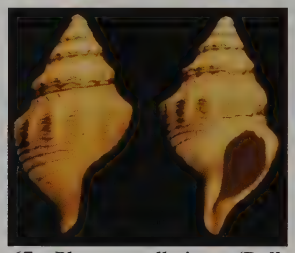
63. *Gymnobela extensa* (Dall, 1881), 4mm (H)

64. *Gymnobela* species A, 10mm GOM(H)



65. *Gymnobela* species B, 8.3mm GOM(H)

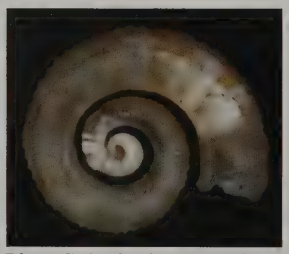
66. *Pleurotomella filifera* (Dall, 1881), 12mm (H)



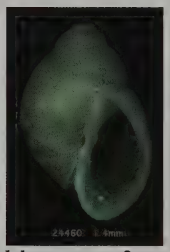
67. *Pleurotomella ipara* (Dall, 1881), 9mm N GOM(H)

68. *Polystira* species, 24.7mm GOM(SD)

69. *Strictispira* species, 14.5mm GOM(M)



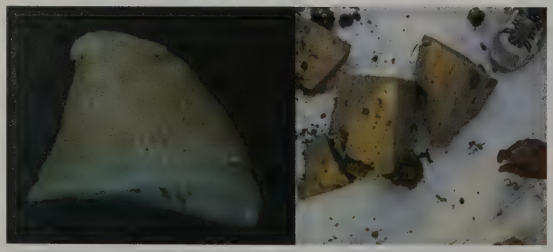
70. *Spirolaxis centrifuga* (Monterosato, 1890), 3.3mm GOM(SD)



Adelacteon sp., 2mm, previously covered, Garcia & Lee, 2002.

71. *Fargoa bartschi* (Winkley, 1909), 2.2mm LA(SD)

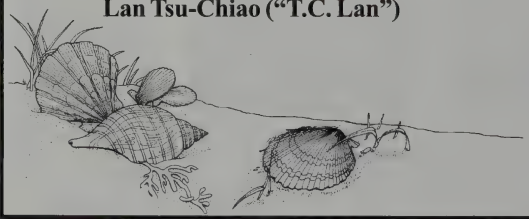
72. *Syrnola* species, 2.3mm GOM(SD)



Emarginula tuberculosa Libassi, 1859 (not yet on list, see text on page 21), 8.8mm, living inside hard sponge (image on the right), dredged in 68m.

In Memoriam

Dr. David Brown
Lan Tsu-Chiao ("T.C. Lan")



Conchologists of America Grants Program

Since 1985 when the COA grant program began, a total of $124,422.00 has been awarded to 161 grant requests. Several early recipients of COA grants have gone on to lead in today's field of malacology, among them: Dr. Rudiger Bieler, head malacologist at the Field Museum in Chicago; Dr. José Leal, now Director of the Bailey-Matthews Shell Museum and current President of the American Malacological Society; and Dr. Gustav Paulay, now heading the malacology section of the Florida Museum of Natural History; just to mention a few. They received our financial help while conducting mollusc related research and they, and others like them, serve as perfect testimony to the success of our grant program. A few grant recipients have gotten more than one award. The highest number was three, awarded to José Leal in 1989, 1992 and 1995. Interesting enough, José now chairs the Grants Committee for COA. This is a committee of three professional malacologists who judge the merit of research proposals and award the grant money.

Grant amount summary for the last 5 years:
2000 - 9 grants, $9,200.00
2001 - 9 grants, $10,729.00
2002 - 9 grants, $10,300.00
2003 - 9 grants, $11,000.00
2004 - 11 grants, $14,583.00 (Details on page 13.)

The significant increase in grant money for 2004 was made possible by the receipt of a $5,000 donation from the **Garmar Foundation** headed by Marilee and Garwin McNeilus. Marilee has been a longtime member and strong supporter of COA. They specified half of their donation be used for the 2004 grant budget and the remaining half be left to grow the Walter Sage Fund, a COA endowment. COA now has two endowment funds: the Walter Sage Fund and the Paul and Heather Johnson Fund. Half of the income from these funds is used to fund the grant program while the remaining income is individually reinvested in each the fund to ensure continued fund growth.

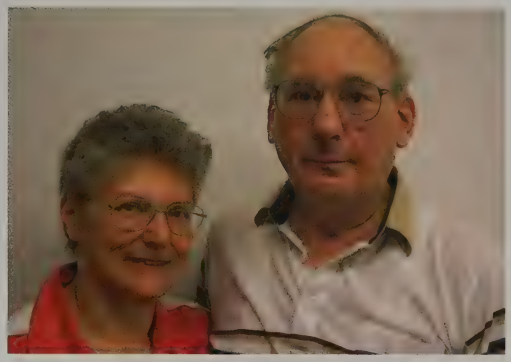
THE WALTER SAGE FUND: This endowment was established in memory of Walter Sage who was instrumental in forging ahead the vigorous growth of the COA organization in the 1980's. Two smaller endowments, the Bill Old Fund and the Veronica Johns Fund were eventually folded into the Walter Sage Fund. The current balance of the Walter Sage Fund stands at $23,519.00.

THE PAUL AND HEATHER JOHNSON FUND: In June of this year, we received a $20,000 donation to be set up as a named endowment in celebration of Paul Johnson's 70th birthday and Paul and Heather's 40th wedding anniversary. Paul and Heather regularly flew in from England to participate at our annual COA conventions. Due to an at-home celebration of Paul's July 4th birthday, they would miss this year's event in Tampa. Instead they sent this extremely gracious donation.

COA is a non-profit organization (501-C3 tax status) and money given to COA is tax deductible for US income tax purposes.

If you have any questions or would like to find out more about the COA grant program, contact:

Donald Dan, COA Grant Donation Committee chairman
6704 Overlook Drive, Fort Myers, FL 33919, USA
Tel. & Fax: (239) 481-6704 e-mail: donaldan@aol.com



Meet Paul & Heather Johnson

Two of our members from the United Kingdom, Paul and Heather Johnson developed their interest in shells while visiting Heather's elderly aunt in Boynton Beach, Florida. On a subsequent trip to the Florida Keys they saw the endless variety of shapes, sizes, colors, and patterns of shells at the Shell Man shell shop. Paul and Heather then arranged a visit to Sanibel Island, Florida, where they gathered shells on the beach and were introduced to R. Tucker Abbott, who was in the middle of his effort to build a shell museum (now the Bailey-Matthews Shell Museum). Needless to say, Tucker's personal charm and extensive knowledge of seashells triggered some serious shell interest. Their relationship with the museum and the various shell dealers blossomed. They also became COA members and consistent participants at the annual conventions.

Pursuit of shells eventually led Paul to devote his collection to the family Volutidae. His volute collection now ranks amongst the best in the world. Heather devoted her initial interest to Muricidae. Her murex collection incredibly numbers over 3,000 specimens, but she has decided to dispose of these so that she can concentrate on the smaller families of Haliotidae, Ranellidae and Strombidae.

The Johnsons live in Coventry, in the middle of the English industrial heartland. Among other things, it is where the sporty and luxurious Jaguar cars are made. Until his retirement, Paul operated a business making specialty grinding and polishing wheels. Paul was an avid golfer for many years and in his spare time, sang bass in a large choral society. Heather is an accomplished double bass player in orchestral concerts. Recently, Heather was elected to the Coventry City Council, the legislative body for a city of 300,000 people. She works on 3 committees, including the important Planning Committee.

The year 2004 is a most fortuitous year for the Johnson's. It is Paul's 70th birthday year and their 40th wedding anniversary. COA is truly grateful to be the recipient of their grant donation in memory of this joyous double celebration.

RE-SEARCHING A NON-WHELK: *Cittarium pica*

by
Robert Robertson
Academy of Natural Sciences of Philadelphia

The large trochid *Cittarium pica* (Linnaeus, 1758) is invariably called a "whelk" in the English-speaking West Indies, but it is not remotely related to the snails originally called whelks in the North Atlantic (*Buccinum*). Both are relatively large, edible, and easily collected where not fished out. *Cittarium* lives on rocky shores, mainly in the lower intertidal zone. The shell interior is pearly and the exterior is patterned with black marks and zigzags (purplish black when faded) on a yellowish white background.

The empty shells are frequently occupied by land hermit crabs, *Coenobita clypeatus* (Fabricius, 1787), a very common sight in the West Indies, where they carry marine shells even up into the mountains. The crab larvae are marine, so that to spawn the adults have to return to the shore.

Recently I published a paper on the natural history of *Cittarium*. At the time I could not remember where I had seen a better illustration of the crab in its shell than the 1743 Catesby one I used, which was originally printed reversed and had to be reversed back so as not to appear sinistral. Then I happened to look again at a publication I did cite and unexpectedly came upon the excellent line drawing I had been looking for. It was in an obvious place, Verrill (1901), one of his detailed and wide-ranging studies of Bermuda. My re-found Verrill figure is reprinted here (Fig. 1). This is pure re-search!

Fig. 1. *C. pica* serving as shelter for a hermit crab as depicted in Verrill, 1901.

Cittarium pica occasionally extends its natural range as far north as southern Florida and Bermuda, but it dies out soon at both these places when winter water temperatures become too low for these tropical animals. Being used for food and bait, the animal has been intentionally reintroduced to both places, but these populations, not surprisingly, have also died out quickly. In Bermuda, the finite "population" of fossil *Cittarium* shells is used by the land *Coenobita* crab mentioned earlier. The number of these fossil hand-me-downs being limited in Bermuda, may limit the possible number of these crabs present there at any one time.

Cittarium has a beautiful, large, externally multispiral operculum (up to a diameter of 49mm) – one of the largest of this type known in any gastropod (Robertson, 2003a). During growth, the operculum must rotate about as many times as there are (many!) coils (fig. 3). In my 2003b paper I inferred partly from structure how this occurs, but there are aspects to this that are still mysterious.

Old, worn *Cittarium* shell exteriors have the black or white areas differentially eroded or corroded so that the black areas become slightly higher in relief than the white areas. The black shell could be harder, but there is a shell-penetrating blue-green alga (*Plectonema*) known to penetrate the exteriors of old *Cittarium* shells, but curiously only in the white areas. I suggested that the alga weakens these areas, causing the observed phenomenon.

Fig. 2. *C. pica* sharing habitat with a blenny (*Bathygobius soporator*, lower right). Note the small barnacles attached to the *C. pica* shell and the numerous fecal pellets consisting primarily of sand grains. Photo by R. Robertson.

In my 2003b paper I could not use colored illustrations, but can do so here. These allow me to illustrate and expand on *Cittarium*'s ecology and on the animal's external morphology and colors, as well as to touch on a few aspects of the functional morphology of the living animal.

Fig. 2 shows a live Bahamian *Cittarium*, dorsal side up, in place in its habitat: in a small (intertidal) tide pool, together with a fish with which it commonly occurs. The fish is a blenny, *Bathygobius soporator* (Valenciennes). The shell apex is worn so the internal pearly (nacreous) layer shows through to the outside. Six or more barnacles (crustaceans) are attached to the shell, and these are also abundant on rock surfaces nearby. *Cittarium* fecal pellets, thick rods, are shown clustered down and to the lower right of the shell. Like other rock-abrading herbivorous snails, *Cittarium*'s feces are gray and consist primarily of sand grains. Considered in geological time, all these herbivorous snails are major causes of rocky shore erosion.

Fig. 4•shows part of a *Cittarium*'s body extended from the pearly aperture. This nacre is overlain by the nearly transparent and soft mantle, which is slightly yellowish brown. A darker and perhaps thicker part of the mantle covers the shell umbilicus. Incrementally, the mantle grows the whole shell, only part of which

Fig. 3. *Cittarium pica* (Linnaeus, 1758), 81mm adult, 18mm juvenile. Collected in shallow water at low tide, south Bimini, Bahamas. The inset shows the operculum (slightly reduced in size), external surface (left), internal surface (middle), and side view (right). The large empty shell weighs 141 grams. Photo by T. Eichhorst.

Fig. 4. The animal extending out of its shell showing: the black head with associated proboscis, eye stalks, and tentacles; the extended greenish foot or propodium (front edge at lower left); and the curved edge of the operculum. Photo by R. Robertson.

can be seen here. The animal's head and associated structures are black. Of these, the paired tentacles are long and thin, and the eye stalks (optic penduncles) are thick and at the front base of the associated tentacle. The small eyes at the tips do not show here. The snout (proboscis) is also black and the mouth is hidden beneath it. The upper part of the foot is green, and this grades into irregular brown marks lower down and all around. The front end of the foot (propodium) is wide and arc-like in outline, and part of the inside of the operculum shows slightly above the propodium. The filaments below and to its right are parts of the epipodium, which is sensory. When the animal is more withdrawn than this, water propelled by beating hairs (cilia) on the single gill (ctenidium) enters the left side of the animal's mantle cavity (behind the head), and exits on the right. The water is used in respiration, but may do more than this. Very primitive marine prosobranchs have a pair of ctenidia, but *Cittarium* and very many others retain only one of these.

There is little recorded information on the diets of carnivorous snails. I mentioned some in 2003b (p. 37). The apple murex, *Murex pomum* (Gmelin, 1791), has been reported to feed on *Cittarium* at Puerto Rico.

The day before I wrote this I happened to receive the latest issue of a scientific malacological journal. In it, the shells of four widely unrelated species, including *Cittarium pica*, are illustrated with computer-generated graphics "that are presented [and?] represent the *optimal shell form* for each species" (italics mine). The *Cittarium* spire is shown much too low and the body whorl is relatively too wide (aspects of the same thing), and thus the figure bears not the slightest resemblance to the actual shell. The same applies to the other three shells. What is "optimal?" Is the author instructing the shells on how to become "optimal" in shape? Whither science?

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Bobbie Houchin with her 2004 Neptunea Award. With Bobbie is Lynn Scheu, who with Lori Schroeder (behind the camera), presented the award.

Longtime officer and board member of COA, Bobbie Houchin's affiliation with COA goes back to 1987 when she attended her first convention in St. Louis. Donald Young was COA President, and his goal was to increase membership to over 800. Much of the responsibility of this challenge and subsequent credit for its success fell upon Bobbie who assumed the mantle of membership chairman in late 1987. Bobbie combed club membership lists and the AMU (now AMS) roster for potential members, mailing out sample copies of American Conchologist to pique their interest. The result was an increase of 190 new members by the end of 1987, well over the 800 goal.

Bobbie continued to push membership numbers upward to the 1300's by mid 1996, when she was elected COA Treasurer. She was a motive force behind the creation of the Walter Sage Fund as well as the main mover in the long awaited achievement of COA's tax-exempt status. She left the onerous and demanding office of COA Treasurer in the summer of 2000, much better organized, better defined, and richer than it had ever been.

Bobbie was not present at the Tampa Bay convention in June to receive her award, because of the imminent birth of a grandchild, the only convention she missed in her 17 years. But Lori Schroeder gracefully accepted the award for Bobbie, swore an entire convention to secrecy and took the plaque back to Louisville in her luggage. A week after the COA convention, Lori and Lynn Scheu, under guise of celebrating Bobbie's birthday, surprised her with a very unusual "birthday present," the Neptunea Award, on behalf of the COA membership. Congratulations Bobbie, a richly deserved award.

Volutes Without a Name

by
Peter G. Stimpson

These are the musings of a seashell collector about one of our more popular families. I have spent the last three years showing some specimens of volutes to professors, curators, divers, dealers, and collectors to get some thoughts on shells I felt might be new species. This is a summary of those efforts.

Number one is a *Volutoconus* specimen very similar to *Volutoconus hargreavesi* (Angas, 1872). It was trawled in 1977 off the NW coast of Australia. It could be a form of *V. hargreavesi*, but has some notable differences. The different color pattern is the most obvious, being a series of axial orange lines with no tents. Other less noticable differences are: (1) a more oval, less cylindrical body, (2) a shorter, wider spire, (3) a larger protoconch, and (4) three protoconch whorls rather than four as is found in *V. hargreavesi.*

The second specimen is possibly a *Miomelon* and was trawled 350 miles off the mouth of the Amazon River, Brazil in June 1956. It was in the Bullis collection. The weight and texture are reminiscent of *Miomelon alarconi* Stuardo & Villas, 1974, from Chile. It has a very dry-appearing surface with fine spiral lines unlike the latticework pattern of *M. alarconi.* There was a suggestion that it might be a dwarf *Adelomelon simulatrix* Leal & Bouchet, 1989. This is a lighter shell with a different pattern, different shape, and no columellar shield and occurs over one thousand miles away.

Specimen number three is an *Amoria* from 16 meters depth, off Broome, Western Australia. At first glance it reminds one of *Amoria turneri* (Griffith & Pidgeon, 1834), with the same shape and color; more specifically it looks like *A. turneri* forma *newmanae*. Other than the smaller size (it has a thick adult lip), the main difference is the fine, more irregular, zigzag axial lines.

Number four is a *Tractolira* from 3,100 meters depth off the northeast coast of Argentina. It has a different shape from *Tractolira sparta* Dall, 1896. It also cannot be *Tractolira terebrosa* Leal & Bouchet, 1989, which is a stark white shell with a huge protoconch.

The fifth specimen is a *Fusivoluta* trawled at 500-1,000 meters depth from central western Madagascar in 2001. Comparing it to a small, immature *Fusivoluta barnardi* Rehder, 1969, shows it to have fewer, heavier axial ribs on the spire and ventral body whorl. The protoconch whorls are longer and the protoconch is smaller. Patrice Bail examined other specimens of this species and is confident it is a new species.

Specimen number six is one of three *Scaphella* pictured. It was dredged at 400-500 meters depth off the Mississippi River Delta, Louisiana, in May 1953. It could be *Scaphella dohrni* (Sowerby, 1903), a great distance from its more typical range off the Florida Keys. It is faded, but it is lighter and has smaller spots, thinner columellar folds, and longer spiral whorls than *S. dohrni.*

The number seven specimen is a small *Scaphella* dredged from 200 meters depth northeast of Escudo de Veraguas Island, Caribbean coast of Panama. Doug Shelton is confident this is a new species as it is very different from juvenile specimens of

Scaphella evelina Bayer, 1971. The spiral body ridges and golden-blotched pattern are unique.

The eighth specimen is a *Scaphella* dredged along with a few others in the Bahamas. It is not *S. dohrni*. This is a very light shell with a white aperture. Compared to *S. dohrni*, it is more oval in shape and has a wider aperture, larger protoconch whorls, heavier columellar plaits, and a larger protoconch.

Specimens number nine and ten are *Notovoluta* and should be compared to each other. Number nine is the volute we know as *Notovoluta pseudolirata* Tate, 1888. Apparently this name was used previously for a fossil *Notovoluta*, so this species may need to be renamed. It is from 250 meters depth north of Perth, Western Australia. Number ten is also labeled *N. pseudolirata*. I have shown this specimen to most of the Western Australian divers and dealers, as well as to Dr. Barry Wilson, and we all agree these are two different species. Number ten has a wavy orange pattern, along with a shorter spire, wider and fewer knobs, and a darker, less conspicuous columella that the number nine *N. pseudolirata*. The data on number ten is absent, but it was trawled by Taiwanese fishermen many years ago.

The number eleven specimen was trawled at 180-250 meters depth off southern Uruguay in 2004. It looks at first glance to be *Adelomelon ancilla magellanica* (Gmelin, 1791), and it may be. There are, however, a number of small differences. In comparison to *A. ancilla magellanica*, it has: (1) a protoconch three to four times the size with a large calcarella [ed. note: a spur-like growth on the protoconch], (2) a texture of tiny, narrowly-spaced spiral ridges over the entire shell, but more prominent on the protoconch whorls (*A. ancilla magellanica* is smooth), (3) an indenture that will fit a razor blade at the sutures, (4) a brown rather than a cream colored columella, (5) a lighter weight, and (6) a larger spire (but shorter than *A. ancilla ancilla*).

The final two specimens are *Ternivoluta* that differ from *Ternivoluta studeri* (von Martens, 1897) in the following characteristics: (1) wider, more oval body, (2) a much shorter spire with virtually no protoconch whorls, (3) no plateau at the shoulder between the teleconch whorls, and (4) a white aperture.

If any *American Conchologist* readers have first-hand knowledge related to any of these specimens, please let me know.

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1. *Volutoconus* 109mm.

2. *Miomelon* 77mm

3. *Amoria* 40mm.

4. *Tractolira* 59mm.

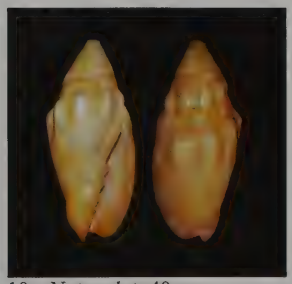
5. *Fusivoluta* 50mm.

6. *Scaphella* 50mm.

7. *Scaphella* 25mm.

8. *Scaphella* 50mm.

9. *Notovoluta pseudolirata* Tate, 1888, 53mm.


10. *Notovoluta* 40mm.

11. *Adelomelon ancilla magellanica* (Gmelin, 1791), 212mm.

12. *Ternivoluta* 40mm.

COA Convention 2004 - Tampa!

As we have come to expect, the COA convention was the sheller's highlight of the year. We started with a hotel having superb accommodations and top-notch service. The Tampa Hyatt is located in a nature preserve, so a short walk out the back door on the boardwalk brought sights of spoonbills, osprey, various seabirds, small marsh rabbits, assorted crabs, and of course, at low tide, tulips, crown conchs, and the like. Personally, while nature is all well and good, I was most impressed with the elevator service. This has to be one of the few high-rise hotels I have ever been in that you did not have to routinely wait for an elevator. It was quite a place.

At this year's convention we had interesting skits, bushels of shells at auction (silent and oral), great presentations and programs, loads of field trips, a pleasant and well-run welcome party and banquet, and a bourse with more dealers and shells than it would seem possible to gather under one roof. Hats off to Betty Lipe and the St. Petersburg Shell Club. They know how to run a convention.

If you have never attended a convention or you haven't attended in awhile, then you are really missing out on a fun and rewarding experiance. Next year we move down the coast to Sanibel for the convention, 19 – 25 July 2005. Actually, we will be just across the causeway in Punta Rassa, at a hotel very similar to the Tampa hotel. You owe it to yourself to start making plans now to attend. You will have a good time (almost a guarantee), meet new friends and great old friends, and you will see a lot of shells; shells worth 10 cents and shells that require a second home mortgage to buy. This really is the event to attend if you are at all interested in conchology, malacology, shell craft, shell collecting, or gathering pretty things on the shore. Now, I will let the pictures tell the rest of the story.

Alan Gettleman & Charlotte Lloyd-Thorpe taking care of COA business at the podium.

Alice Monroe teaching folks how to take that perfect shell picture.

A noted conchologist discusses the new world record letter olive.

Steven Coker, Doris Underwood, and Katherine Smith ready and seemingly very happy to collect auction payments.

Dinner cruise being enjoyed by Betty Lipe, Val Hart, Bob Lipe, & Mike Hart. Val & Mike were the Kiwi connection for COA 2004.

Bev, Neil, and Al Deynzer make the shell business a family affair.

The three gentlemen are obviously enjoying the converence; Donald Dan, Don Pisor, & Hank Chaney.

Australian smiles from Hugh Morrison and Simone Pfuetzner.

Donald and Victor Dan offer great shells and longstanding support of COA.

The lovely lady who takes all of these pictures, Faye Mucha, with Jack Lightbourne & Marilyn Northrup.

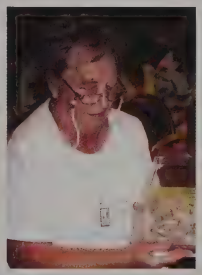
Cheryl & John Jacobs, serious (with a smile) competitors at the silent auction.

Edith Chippeaux, Fred Leonard, Josy Wiener, & ceramic snail, species unknown.

Linda & Kevan Sunderland, regular contributors to American Conchologist.

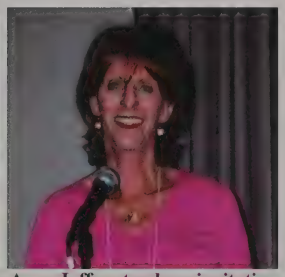
COA elected officers for 2004: Bobbi Cordy, Carole Marshall, Hank Chaney, Alice Monroe, & Steven Coker.

Hank Chaney & Tom Grace comparing notes. We known why Tom is laughing.



Sybil Burger with auction treasures.

Harry Lee indicates size of the *Rissoina* that got away.



Anne Joffe extends an invitation to Sanibel for COA 2005.

Bailey-Matthews Shell Museum in Need

As most of you know, Hurricane Charley hit Sanible and Captiva Islands particularly hard. There was some beach damage, power lines and trees were downed (thousands of trees are down!), and some structural damage. The good news is the museum was able to weather the storm with little damage. The bad news is the meseum was unable to open for an extended period and suffered quite a revenue loss. You can help by sending a tax deductible donation to the Bailey-Matthews Shell Museum (with "Emergency Operation Fund in the memo section). Better yet, become a member of the museum. Details are available on line at: http://www.shellmuseum.org/membership.html

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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America

CONCHOLOGISTS OF AMERICA, INC.

Volume 32, No. 4 December 2004

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world.

In 1995, COA adopted a conservation resolution: *Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.*

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Editor's Comments:

First, an apology to the members of the Suncoast Conchologists. In my description of the COA 2004 convention in the last issue I stated the sponsoring club was the St. Petersburg Shell Club. I should have said the convention was a joint effort of the two clubs. Certainly the members of the Suncoast Conchologists were in evidence in every key function throughout the convention. No slight was intended to these hard working folks – it was an oversight.

Next, a huge thanks to Marcus Coltro and Carlos Henckes of Femorale in Brazil. They have worked extremely hard to get our new COA web site up and running (http://www.conchologistsofamerica.org). Carlos did the design and layout while Marcus oversaw the operation and made sure the program stayed on track. The National Academy of Sciences at Philadelphia (NASP) graciously sponsored our previous web site under their contract and on their server. We thank the folks at the NASP for supporting us for so many years and for helping develop this new site.

On page 24 you will find the form for the Neptunea Award. If there is someone you wish to nominate for this award, please make a copy of the form and mail it to Carole Marshall (her address is on the form).

And finally an exciting email was posted on Conch-L by Fabio Wiggers from Brazil announcing the *International Code for Zoological Nomenclature*, published by the International Commission for Zoological Nomenclature (both abbreviated ICZN) is now available on the Internet at: http://www.iczn.org/iczn/index.jsp. The first International Zoological Congress met in Paris in 1889 and adopted a standard nomenclatural code based upon the work of Linnaeus. The code was revised in 1901 and a permanent International Commission on Zoological Nomenclature was established. The commission regulates the scientific naming of animals through the ICZN code which is now in the forth edition (January 2000). The code is now available on line with a search engine and the body of the text has embedded links for ease of referencing various subjects. This is a very worthwhile addition to the web.

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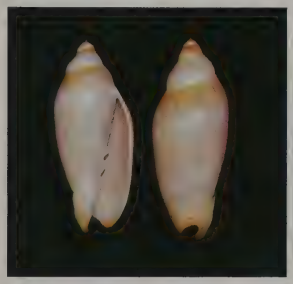
BACK ISSUES are available from Hank Foglino, Properties Director. Prices: prior to 1985, $3 each, 1985 to current, $5 each; postage extra.

Volutes Without a Name II

by
Peter G. Stimpson

[Ed. note: The article, "Volutes Without a Name," by Peter G. Stimpson in the last issue had a mix up in the images. The *Tractolira* species (fig. 4) was also shown in error as the *Volutoconus* (fig. 1). In order to correct this, (with apologies to Dr. Stimpson) the proper image and the original description are repeated here for the *Volutoconus*. Also included is an unknown *Fulgoraria* that did not make it into the original article.]



Volutoconus

Fulgoraria

These are the musings of a seashell collector about one of our more popular families. I have spent the last three years showing some specimens of volutes to professors, curators, divers, dealers, and collectors to get some thoughts on shells I felt might be new species. This is a summary of those efforts.

Above left is a *Volutoconus* specimen very similar to *Volutoconus hargreavesi* (Angas, 1872). It was trawled in 1977 off the northwest coast of Australia. It could be a form of *V. hargreavesi*, but has some notable differences. The different color pattern is the most obvious, being a series of axial orange lines with no tents. Other less noticable differences are: (1) a more oval, less cylindrical body, (2) a shorter, wider spire, (3) a larger protoconch, and (4) three protoconch whorls rather than four as is found in *V. hargreavesi*.

Above right is a *Fulgoraria* sp. (105mm) from Taiwan, trawled from deep water in September 2001. Comparisons to *Fulgoraria cancellata* (Kuroda and Habe, 1950) show them to be thinner, to have a smaller protoconch, an absence of a pale band at the base of the spire, a lack of ridges over the body whorl, and numerous (4-5) strong columnar plaits. *Fulgoraria chinoi* (Bail, 2000) is also a fatter shell with a gray-black surface, a smaller protoconch, and 1-2 weak columnar plaits. The columella is completely different than *F. rupestris* and *F. hamillei*, which have a protruding columella with double the number of plaits.

If any American Conchologist readers have any first-hand knowledge related to either of these species, please let me know.

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In Memoriam

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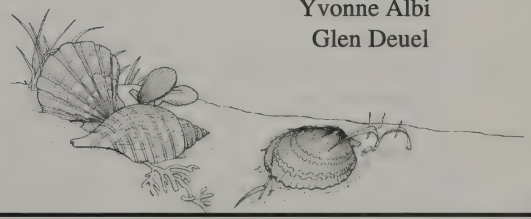


Front cover: A pair of *Cymbiolista hunteri* (Iredale, 1931). The upper shell (119mm) is typical of the color form from off New South Wales, Australia. The lower shell (116mm) is the deep-water variant from off Queensland, Australia.

Back cover: A view of sunset over San Carlos Bay from the Sanibel Harbour Resort & Spa, site of COA Convention 2005. Every room in the hotel faces the bay and offers this view.

Made for SEM: The Fascinating World of Scissurellids

by
Daniel L. Geiger

Histology. The anatomy of scissurellids cannot be studied by traditional dissection, because of the small size of the animals; note that the animal is even smaller than the shell! In order to investigate the internal anatomy of these tiny snails, they have to sectioned, i.e., they are cut into very fine salami slices (2 µm = 1/500 mm thin) for light microscopy (brightfield illumination). The animals are cut with freshly broken glass knives, which are much sharper than razor blades. It is accomplished with a microtome shown on the bottom left, and the stained sections are then viewed under a compound microscope. Much information has yet to be obtained on scissurellids. A couple of sections are shown on the right. The top image shows a section through the head with the black eye, and the light structure in the center is the odontophore. The bottom image shows a fine detail of the gill of *Sinezona rimuloides* with a structure called bursicles (first time in print), which are characteristic for Vetigastropoda.

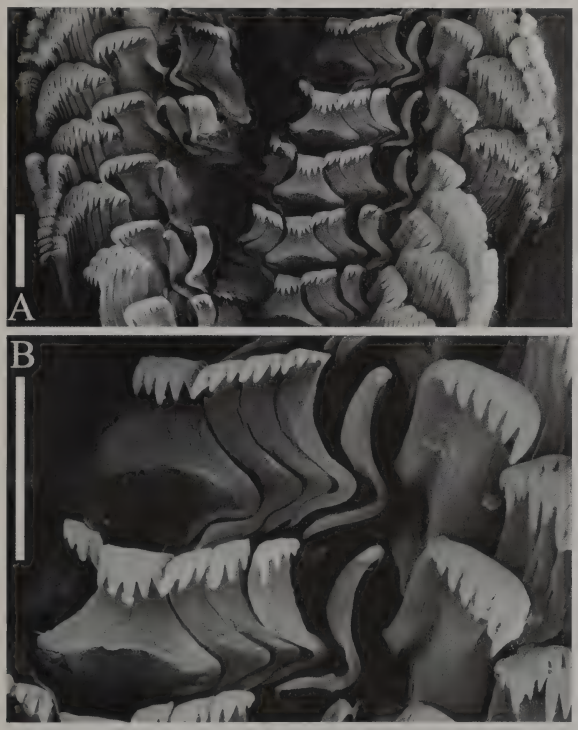
Over the past few years, I have become focused on the tiny scissurellids. Essentially, they are mini-pleurotomariids: trochiform shells with a slit or hole. The group consists of approximately 170 described species, all of which are quite small. Sizes range from 0.5 mm to giant specimens of greater than 10 mm, with an average of 0.8-1.5 mm. Given that they are the size of sand grains, the group has literally been overlooked, making them an ideal group for study. Their small size also makes the use of a good microscope imperative; for best viewing and imaging one even has to use the heavy gun of the scanning electron microscope (SEM). The SEM was invented in the 1960s, yet the last monographs of the scissurellids were published by Pilsbry (1890) and Thiele (1912). Hence, there is plenty of opportunity for discovery in this group of microshells. When I recently discussed some of the ongoing work on scissurellids with Henry Chaney at the Santa Barbara Museum of Natural History (and current COA President) he exclaimed: "Look at these shells: they are made for SEM!"

One of the tasks when starting with a monographic project is to survey the literature and start looking at as many specimens as possible. In the course of doing such an initial sweep, many problems became apparent that needed to be addressed. The principal issues were the definition of genera and what the various described species actually look like. A number of species had been assigned to more than one genus, and many species were only known from small line drawings in the original descriptions. Here I want to provide a short review of recent finds, particularly with respect to the shell morphological diversity and the genera in the group. Further details have been provided elsewhere (Geiger, 2003).

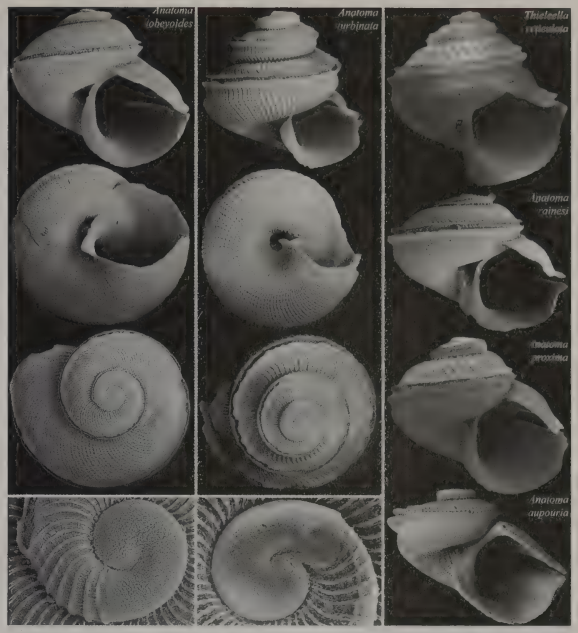
The illustrations provided here give just a quick browse through the scissurellid diversity. Genera are distinguished by overall shell-shape, which may be neritiform (*Incisura*), calyptraeiform (*Depressizona*), or trochiform (*Scissurella, Anatoma*); the condition of the slit, which may be open (*Scissurella*), closed to a foramen (*Sinezona*), or missing (*Trogloconcha*). Species are distinguished by shell-shape (*Anatoma tobeyoides* vs. *An. turbinata*), strength and density of the sculpture (*Scissurella rota, Sci. staminea, Sci. declinans*), and protoconch sculpture (*Sukashitrochus atkinsoni* vs. *Suk. indonesicus*). Although only single illustrations are provided here, these distinctions are consistent within species and co-variable between species.

The phylogenetic relationships among scissurellid lineages, as well as their placement among Vetigastropoda is highly

uncertain. What we know so far is, the traditional family Scissurellidae is not a natural group, but what is colloquially called a "garbage can taxon": any small vetigastropod that does not fit anywhere else is placed in Scissurellidae *s.l.* What is certain to date is that Scissurellidae *s.s.*, Anatomidae, and the vent families (Temnocinclinae, Sutilizoninae) are three independent groups. Whether the two vent families together comprise a single radiation, or two separate ones is unclear, though some affinity with the vent limpets Lepetodrilidae is quite likely. The three larocheine genera share radular features, but their placement within Vetigastropoda is open. Given that Scissurellidae and Anatomidae are certainly not monophyletic and are much closer in terms of shell and radular morphology, it is unlikely that larocheines are closely related to either of them. *Depressizona* has a unique, calyptraeid shell form, but the animal is unknown. Its placement is anybody's guess.



Radula preparations from scissurellids are daunting. Radulae can be obtained from dried animals by first soaking the specimens in water overnight, and then pulling the animal out of the shell using the finest needles and forceps. The shell is dried afterwards. The animal is dissolved in potassium hydroxide (KOH), and the radula and operculum are retained. The radula has a tendency to curl, hence has to be flattened on double sided tape. Given the small size of the radula (approximately 0.5 mm long, 0.2 mm wide), very fine tools have to be employed under a dissecting microscope. The finest needles are made from tungsten wire and allow fairly good handling of the radulae. I like to tear the radula in the middle to get a better view of the central field as shown in the illustrated radula of *Scissurella jucunda* from False Bay, South Africa (AMS 380717), shown at two different magnifications.



Left column: *Anatoma tobeyoides* Geiger & Jansen, 2004: southern Australia (from Geiger & Jansen, 2004: Holotype AMS C.431072). Center column: *Anatoma turbinata* (A. Adams, 1862): Indo-Malayan Archipelago (from Geiger & Jansen, 2004: AMS C.402664). Right column, top to bottom: *Thieleella reticulata* Bandel, 1998: Philippines (USNM 244948). *Anatoma rainesi* Geiger, 2003: Easter Island (from Geiger, 2003: paratype LACM 2910). *Anatoma proxima* (Dall, 1927): Louisiana (Emilio Garcia Collection 24459). *Anatoma aupouria* (Powell, 1937): New Zealand (from Geiger & Jansen, 2004: AMS C.402696).

Scissurellidae *s.s.*

Scissurella. Shell trochiform, with open slit, body sculpture usually with axials and spirals, protoconch sculpture variable: smooth, fine axials, strong axials, 1-2 mm. Approximately 60 described species. Worldwide.

Sinezona. Shell trochiform, with foramen, body sculpture usually with axials and spirals, protoconch sculpture variable: smooth, fine axials to strong axials, 1-2 mm. Approximately 30 described species. Worldwide

Satondella. Shell trochiform, depressed apex, with foramen, keels of foramen strongly elevated, 1-1.5 mm. Three described species. Pacific, Caribbean.

Sukashitrochus. Shell trochiform, with foramen, base with strong spiral keels, 1.2-2 mm. Seven described species. Indo-Pacific.

Incisura. Shell neritiform, with more or less rapidly expanding body whorl, with open slit or foramen, body sculpture mostly smooth, 1 mm. Two described species. Australia, New Zealand.

Ariella. Questionable validity, 0.5-1 mm. Same as *Sinezona*, but lacks a selenizone.

Coronadoa. Trochiform, no slit or foramen, radula with enlarged lateral tooth 5, 0.5-1 mm. One described species. North Pacific.

Depressizoninae/Depressizonidae, incertae sedis.

Depressizona. Shell calyptraeiform, with foramen, 1.2 mm. Monotypic, three known specimens. Easter Island.

Anatomidae.

Anatoma. Shell trochiform, biconical, with open slit, protoconch sculpture smooth, flocculant, 1.5-10.5 mm. Approximately 45 described species. Worldwide.

Thieleella. Shell trochiform, biconical, open slit, protoconch sculpture reticulate, 2-4 mm. Five described species. Worldwide.

Larocheinae/Larocheidae, incertae sedis.

Larochea/Larocheopsis. Trochiform, no slit or foramen, with brood pouch in shell, 1 mm. Three described species. New Zealand.

Trogloconcha. Trochiform, inflated, no slit or foramen, all lateral teeth similar in size, 0.7-1.1 mm. Three described species. Pacific.

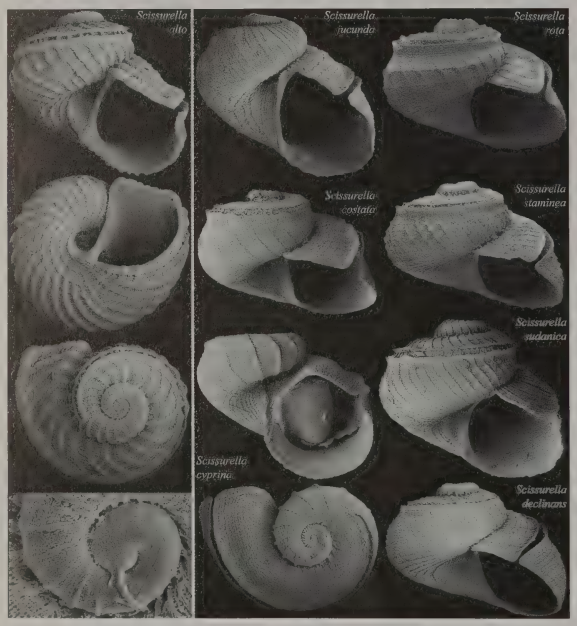
Temnocinclidae, Sutlizonidae.

Temnocinclis, Temnozaga, Sutilizona. Only found at hydrothermal vents, unlikely to be encountered in private collections, 2-4.1 mm. Five described species.

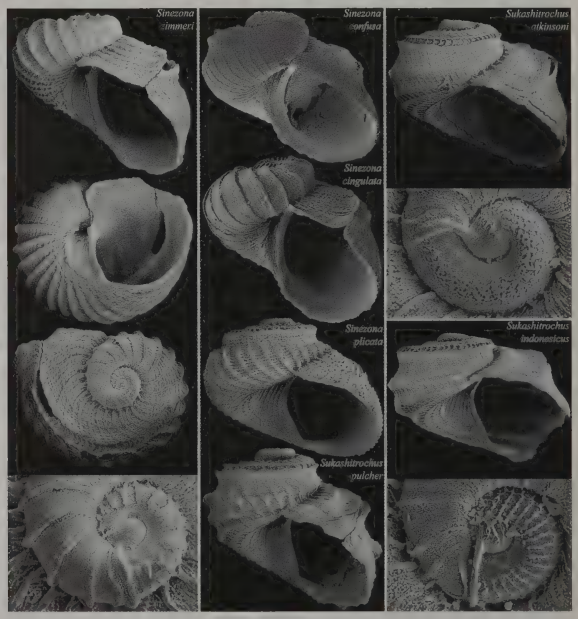
In terms of material, not many persons actively collect microshells. This fact also applies to institutional collections. Some collections are known for their microshell holdings with hundreds of lots (e.g., Australian Museum, Sydney; National Museum of New Zealand; United States National Museum), but others are surprisingly low in scissurellids. The American Museum of Natural History has only twelve lots! Besides checking with colleagues at museums, I also look to collaborate with private collectors throughout the world. I have had the good fortune to be entrusted with specimens from Emilio Garcia, Kirstie Kaiser, Bret Raines, Colin Redfern, Benjamin (Solly) Singer, Alwyn Marais, and Felix Lorenz Jr. In some of the material new species were encountered, with some already described (e.g. *Anatoma rainesi* Geiger, 2003) and several others being currently written up.

HELP!

If you have scissurellids in your collection, I would very much like to have a look at them. It does not matter whether they are identified or not, whether they are common species or rare, they are all valuable for ongoing work towards a worldwide monograph of



Left column: *Scissurella alto* Geiger, 2003: Easter Island (from Geiger, 2003: holotype LACM 2914). Right column, top row left: *Scissurella jucunda* Smith, 1890: South Africa (AMS 380716). Top row, right: *Scissurella rota* Yaron, 1983: Red Sea (NMSA S2862). Second row, left: *Scissurella costata* Orbigny, 1824: Mediterranean Sea (AMS 406387). Second row, right: *Scissurella staminea* (A. Adams, 1862): Japan (LACM 79-75). Third row, left: *Scissurella cyprina* Cotton & Godfrey, 1938: southern Australia (AMS C. 402703). Third row, right: *Scissurella sudanica* Bandel, 1998: East Africa (AMS 406389). Bottom row: *Scissurella declinans* Watson, 1886: Indo-Pacific (AMS C.406355).



Left column: *Sinezona zimmer* Geiger, 2003: Easter Island (from Geiger, 2003: holotype LACM 2912). Center column, top to bottom: *Sinezona confusa* Rolán & Luque, 1994: Caribbean (Colin Redfern Collection). *Sinezona cingulata* (O. G. Costa, 1861): Mediterranean (AMS 380215). *Sinezona plicata* (Hedley, 1899): Indo-Pacific (AMS C379083). *Sukashitrochus pulcher* (Petterd, 1884): southern Australia (AMS C.379967). Right column, top to bottom: *Sukashitrochus atkinsoni* Tenison Woods, 1876: southeastern Australia (AMS C.37829050), and protoconch close-up. *Sukashitrochus indonesicus* Bandel, 1998: the Indo-Malayan Archipelago (AMS C.378318), and protoconch close-up.

the family. Specimens in any type of preservation are of interest: shells only, shells with dried animals, fluid preserved specimens, and fossils. I will offer in return expert identification of your specimens and all specimens will be returned. Some specimens may become candidates for electron microscopy. In the past, this has meant coating specimens with gold, but newer microscopes can do without (e.g. *Anatoma proxima* shown here). If you have any questions, I will be happy to discuss those with you. I am looking forward to hearing from you.

Abbreviations: AMS: Australian Museum Sydney, Sydney, Australia. LACM: Los Angeles County Museum of Natural History, California, USA. NMSA: Natal Museum, Pietermaritzburg, South Africa. SBMNH: Santa Barbara Museum of Natural History, California, USA. USNM: United States National Museum, Smithsonian Institution, Washington (DC), USA. WAM: Western Australian Museum, Perth, Australia.

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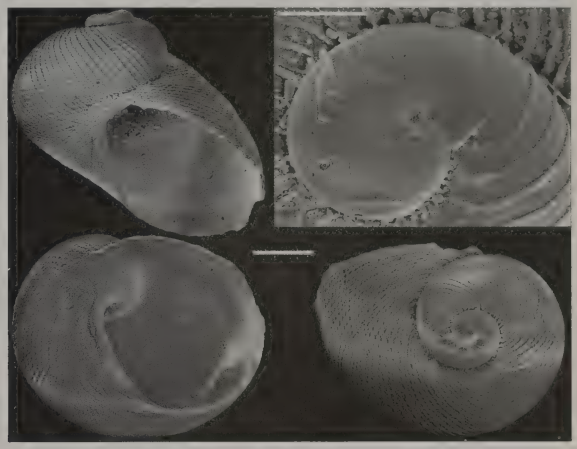
Pilsbry, H.A. 1890. *Manual of Conchology. Structural and systematic. with illustrations of the species By George W Tryon, Jr. continued by Henry A. Pilsbry.* Academy of Natural Sciences of Philadelphia, Philadelphia. 323 pp., 68 pls.

Thiele, J. 1912. Scissurelliden und Fissurelliden. In: *Systematisches Conchylien-Cabinet von Martini und Chemnitz.* Kobelt, W. & H. C. Küster. (eds.): pp. 1-34, pls. 1-4. Bauer & Raspe, Nürnberg.

Images from top to bottom, first row: *Trogloconcha christinae* Geiger, 2003: southern Western Australia (from Geiger, 2003: holotype WAM S10886). Second row: *Satondella senni* Geiger, 2003: Easter Island (from Geiger, 2003: holotype LACM 2911). Third row: *Incisura lytteltonensis* (Smith, 1894): New Zealand (from Geiger, 2003: LACM 87-87). Bottom row: *Depressizona exorum* Geiger, 2003: Easter Island (SBMNH: third known specimen).



Trogloconcha tesselata Kase & Kano, 2002: AMS C.406375, 64m, GBR, Swain Reefs, 3km NE of west side of Bylund Gillett Cay, Queensland, Australia, 21.7°S, 152.433°E. Scale bar for the shells = 200µm. Scale bar for the protoconch = 50µm.

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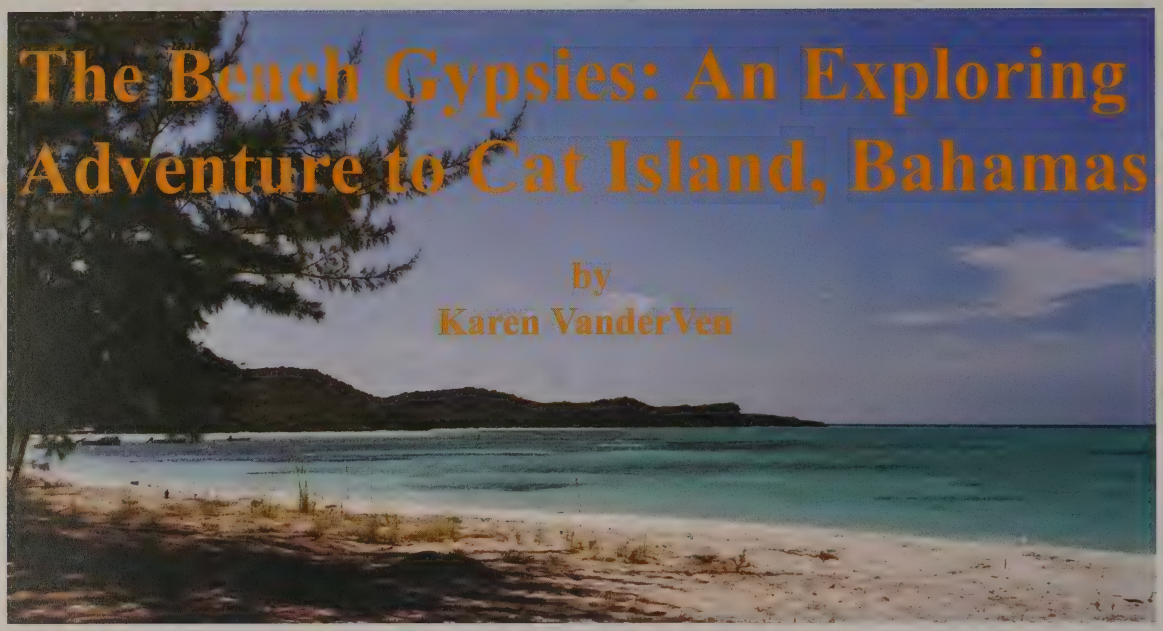

The Beach Gypsies: An Exploring Adventure to Cat Island, Bahamas

by
Karen VanderVen

"Mayaguana....Long Island....Cat Island....Paradise Island...Eleuthera...Abaco...." As the Weather Channel announcer names the Bahamas islands that are being touched by Hurricane Frances I feel not only a profound sadness at anything that attacks these beautiful and friendly spots where I have spent so many wonderful hours and days, but also a sense of disbelief. Can it be just a bit more than a month ago as I write this that I was on Cat Island, exploring new sites and experiencing, right up until the last day, glorious weather?

Cat Island is one of the outer islands of the Bahamas, east of Nassau, the Abacos and Eleuthera. This July trip was billed as an exploratory trip by Jim and Bobbi Cordy (trip leaders). We would go to look around and see what was there. So I opened myself to the search and abandoned my usual preset wish list for red tulips and *Tellina magna.* I'll admit that I hoped for a *Fastigiella carinata,* a rare cerithium-like shell that has been found in Eleuthera and advance word had it could be on Cat.

There is always a sense of anticipation before any shell trip, even if I have visited an area before or know what shells I might expect to find. Will I find something "new"? Has the shell fauna changed since the last visit? When a collecting group has never been to an area, however, there is a heightened curiosity. What is there and where will it be found?

In addition to the Cordys, from Merritt Island, Florida, the other shellers were all Pennsylvanians; myself and my sister Clare Horner from Pittsburgh, Ken and Karen Speicher from Reading, and Jere and Patricia Price from Olney. In honor of the Pennsylvania contingent, each day I decided to collect a symbolic *Lucina pensylvanica.* This species seems to be very common in the Bahamas and in this respect Cat Island was no different from the other Bahamian islands. They were *everywhere,* every day. While other species were not so abundant, nonetheless this expedition to Cat yielded many exciting finds and a wide variety of species.

Pussyfooting around

On arrival at Cat, we were driven north from the airport, pausing to note the birthplace of the famous actor Sidney Poitier set back from the road. When we arrived at our waterfront house, we found the vehicles we were to use for transport around the island awaited us. A decrepit truck and a small van with only a front and back seat, for 8 people!

Like highly motivated and enterprising shellers, we weren't going to let the slight matter of insufficient space get in our way. Clare, the smallest, would ride in the minuscule area behind the truck's front seat, occupied by Bobbi and Jim; while three of us, Karen, Patty and myself would squeeze into the back seat of the van, with Ken and Jere in front. It was necessary for one person to prop herself up on the wheel casing and we came to call this "riding hump." We graciously fought each other daily in order to "ride hump" and ensure that the others would have a comfortable ride.

That first afternoon I set out in front of our house in Bennett's Harbour, on the non-ocean side, to see what was there. I was able to drift on top of a reef area at the end of an iron rock point and there were very interesting finds, including: *Latirus angulatus, Pilsbryspira albocincta, Trivia pediculus, Xenophora conchyliophora* (our first carrier shell), and a colorful little colony of my favorite, *Columbella mercatoria.* Lying on the bottom of a large sandy area all alone was a dark pair of checkerboard clams, *Macrocallista maculata.* Clare also brought in a *Phyllonotus pomum.* We began to find *Thais deltoidea,* the deltoid rock shell, which had a special appeal to Jere, as one of his specialties is rock shells.

This excursion was just the appetizer, however. In the days to come we would systematically explore the northern, middle and southern parts of the island, all the while jamming a crowd into vehicles meant for a couple.

Northern Exposure

The next day, shelling began in earnest. Our convoy headed north and plunged into an area called Orange Creek, where there were some shoreline rocks to turn and expanses of sand. Among the finds here were a nice selection of typical Bahamian species: *Mitra puella, Murexiella macgintyi, Tonna maculosa, Hastula hastata, Cerodrillia thea, Cyphoma gibbosum, Fasciolaria tulipa, Cymatium nicobaricum, Strombus raninus, Oliva reticularis, Tegula excavata,* and others. Bobbi retrieved an uncommon *Cymatium muricinum.*

That afternoon, even further north, we landed on Port Royal Beach, where Jim found a nice looking chank, *Turbinella angulata,* and where others picked up *Morum oniscus, Fasciolaria tulipa, Pilsbryspira albocincta,* and the usually scarce *Latirus angulatus.* There were bivalves such as *Pinna carnea, Lima scabra,* and the pretty princess venus, *Periglypta listeri.* An exciting event for all of us was watching a group of apple murex *(Phyllonotus pomum)* grouped together laying eggs (obviously none were collected). Barry the Cuda was hanging out nearby, seeming to enjoy something new to look at this fine afternoon.

Smith's Bay, with no lettered olives in sight, but plenty of other nice shells. This photograph and the title scene of Devil's Point by Karen VanderVen.

Got Milk Conch?

Having covered the northern end of the island, it was time to check out the middle range of potential collecting spots. We went to Fernandez Bay, a private resort. We managed to park and cheekily entered the water in front of the buildings. "Ask forgiveness, not permission," I advocated in case anybody should come to question our presence. This beautiful cobalt blue mini-sea was Bivalve Heaven. There were candy stick tellins, *Tellina similis, Trachycardium egmontianum, Macrotoma fragilis, Macrocallista maculata,* and strawberry cockles, *Americardia media.* In a sandy area I also picked up a perfect little *Xenophora conchyliophora* no bigger than a thumbnail; Ellen Bulger would love it. There were also *Conus jaspideus* and *Conus flavescens.*

We continued on to Smith's Bay, the spot where the weekly mail boat docked and that we informally nicknamed the 'mailboxes.'

The milk conch, *Strombus costatus,* a solid heavy shell found from the Carolinas (rarely) to Brazil, and of course, the Bahamas. Typically about 100-150mm in length but has been found much larger. The shell may be smooth surfaced or have spiral ridges as seen on this specimen. Photograph and image by Jim Miller.

We joked about whether we'd find lettered olives (although not a Bahamian species) there. There were milk conchs, *Strombus costatus,* for Pat and others, and Ken picked up a nicely colored *Pecten ziczac.* Jim retrieved a large *Fasciolaria tulipa* and *Cypraea cinerea.* Some of us swam further out to examine the shoreline of the channel. There we found turnable rocks with some real treasures underneath; a pair of the unusual orange, black, and white *Mitra dermestinum,* and *Murexiella macgintyi.*

Cypraea zebra from the southern area of the island. Note the ocellated spots that often serve as a key identifying feature of this species. Photograph and image by Jim Miller.

We also plumbed another beach near "The Mailboxes" where lovely *Calliostoma jujubinum* abounded. While these were under almost every slab, they seemed to be quite localized in this middle area of the island. It was here that Jim also found an unusual *Buccinum* species and a *Dermomurex paupercula.* We also collected tiny *Arene cruentata, Astralium phoebium*, and an interesting bivalve, *Limarea pellucida.*

Bobbi retrieved a *Fastigiella carinata* and that got my hopes up that perhaps there would be one somewhere for me. On a subsequent visit to "The Mailboxes" a thrill for me was to casually lift a rock and see suddenly drifting down in front of me, almost unmistakable in its distinct shape, a *Fastigiella carinata.* After all my years of hoping, I had found one at last.

We were pleased with what we were finding in this middle section of the island but still wondered if there was some phenomenal area still to be found where we would come upon something quite unexpected? Surprise and anticipation are the essence of the exploratory mentality and our hopes were up.

The calico or checkerboard clam, *Macrocallista maculata*, is a common resident of sandy areas and always a welcome addition to a shell collection. Photo & image by Jim Miller.

These are the *Leucozonia* cf. *nassa* found off the southern portion of the island. Abbott (1974) calls these the subspecies *leucozonalis* (Lamarck, 1822). Photo & Image by Jim Miller.

The sunrise tellin, *Tellina radiata*, is found from South Carolina to the Guianas. The red-tipped beaks are a useful identification tool. The yellow form without rays was called *unimaculata* by Lamarck, 1818. Photo & image by Jim Miller.

Go South

Having covered the northern and central parts of the island, it was time for our convoy to wend its way to the wider foot-shaped southern portion. During our first plunge we found acres of territory to cover on a grassy bottom that gave way to sand and a reeflet several hundred yards out. Undaunted by distance, I continued out over the sandy bottom. Suddenly, all by itself, a helmet-like shape lay there. A *Cassis tuberosa*, 70mm long and in perfect condition. Every now and then there were pairs of *Tellina radiata*, the yellow variety, but beautiful, shiny, and deeply colored. When I got back in I found that others had found such species as *Pyramidella dolobrata* and *Trivia pediculus.* Karen (the other one) came in with pretty *Asaphis deflorata* and *Cypraea cinerea.*

Towards the end of the trip while we were exploring the southern island beaches, we once again caravanned through a resort area out to the shore line. There was a large shallow channel that led out to the ocean. We plunged in. "We'll see," I thought, seeing another typical sandy bottom with grass patches. There were plenty of *Lucina pensylvanica* and a bubble shell (*Bulla striata)* or two. I kept working my way out and eventually encountered an area bordering each side of the channel punctuated with slabs of rock. I started in turning rocks and quickly realized there was something special under almost each rock. Looking around to see how others were faring, I could see Clare, Ken, Jim and Pat hard at work, plunging down, coming up, swimming a bit, and heading down again.

Jim found a rare and unusual *Attiliosa aldridgei.* Tops for me was the stunning brown and pink turrid, *Splendrillia fucata*

that had just been waiting for me under a rock. There was a rare *Pterotyphis triangularis*, the uncommon *Bursa thomae* with its distinctive purple aperture, large *Conus regius, Conus mus,* live *Cypraecassis testiculus*, another *Fastigiella carinata, Cypraea zebra, Cypraea acicularis, Muricopsis rosea, Bailya parva*, and *Mitra nodulosa* in a range of sizes. There was a very unusual *Latirus* species, perhaps a variant of *Leucozonia nassa.* The whorls of this species are usually angular and, according to *Bahamian Seashells*, those with a rounded body whorl are seldom seen. These specimens, however, were not just rounded; they were extremely round and more bulbous than the depicted variant. Furthermore, these were black tipped with either gray or orange body whorls. Bivalves included colorful *Caribachlamys sentis, Caribochlamys ornata*, and *Tellina fausta.* Pat found a beautiful red pen shell, *Pinna carnea*, and Clare found a jewel box, *Chama macerophylla.*

The author's treasured *Splendrillia fucata,* found under a rock off southern Cat Island. Photo & image by Jim Miller.

Having focused our shelling activities on the lee side or the south shore of the island, we were curious about the ocean side. We enjoyed a typical Bahamian ride there, up and down a pitted dirt road that brushed us with palms and made us think the trip would take forever. Several us went down the dunes into the water once we arrived and found there were few shells, except some *Hastula hastata,* identifiable by their trails in the sand patches, several *Tellina radiata,* and for the other Karen, a *Spirula spirula.*

Concatenations

After leaving the beaches each day we would stop at the roadside stores to stock up on needed items for the next day. We quickly established the ABC's of shelling supplies: Alcohol, Baggies and Bottled Water, and Clorox. While shopping we noticed how friendly and helpful the Bahamians were.

Each evening we enjoyed one of Bobbi's marvellous meals. ("When *are* you going to write that *Shell Trip Cook Book,* Bobbi?") We organized a kitchen detail to whisk through clean up, sat around reading various shell books, worked on the ubiquitous vacation cottage jigsaw puzzle, and soon were on our way to bed.

So what was distinctive about Cat Island as compared to other Bahamian islands? First of all, it seemed quite apparent that the best shells were to be had at the southern end of the island. Then, it seemed that a find might occur totally unexpectedly, and be one of only one or two of the species to be found, e.g. the perfect *Macrocallista maculata* and *Cassis tuberosa*, alone on a huge expanses of bottom. At the same time, some shells seemed to be locally colonized. *Calliostoma jujubinum,* for example, were abundant off the middle of the island, but not found in other areas.

During this week of shelling, tucked into our two conveyances, we must have driven hundreds of miles as we went north and south and back again on the main road, and in and out of various dirt, and often heavily pitted, roadways. My travel mates helped me pick titles for this article. Patty suggested "The Beach Gypsies" since we travelled back and forth to so many spots, while Ken came up with "Got Milk Conch?" to characterize the "Mailboxes" area where we found many specimens of this species.

At the end of our last shelling day, the weather began to change with periodic thunderstorms sweeping in. While waiting at the airport, several of us visited the famous "Hermitage," an early historical settlement on the island. More strong storms rolled in that ultimately delayed our return flights. But we all made it safely, with memories of adventure and surprises, and in our shell bags, collectively, over 100 species.

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RETURN TO THE ISLANDS

The 33rd annual convention and meeting of the Conchologists of America will be held this summer, Tuesday, July 19 through Sunday, July 24, 2005. The location will be the Sanibel Harbour Resort and Spa, Punta Rassa, Florida. Punta Rassa and the Resort are located on the mainland just before you cross the Sanibel Causeway. The new Ft. Myers airport will be open, making easy connections for those flying in.

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There will be several field trips on Monday, July 18th, the day before the convention begins, as well as on Friday morning, July 22nd. The Dealers'

Bourse will be on Saturday and Sunday, July 23 and 24, with the Banquet on Sunday evening.

Highlights will include a Mini Shell Show and Mermaid Parade, An Evening with Peter Dance (noted author and malacologist), Open House Cocktail Party at the Bailey Matthews Shell Museum, Our COA Annual Oral Auction (Friday evening), plus many surprises taking shape as we proceed with finalizing events.

Start making your plans for this wonderful event. The registration forms will go out by the end of the year.

One of the hotel pools with the San Carlos Bay in the background. The Sanibel Harbour Resort and Spa is the perfect facility for our convention with luxuriant accommodations, attached convention center, four restaurants, shops, health spa, bars, tennis courts, pools, common rooms, and beach walks. See you there!

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**** ALABAMA MOLLUSKS – Freshwater, http://home.hiwaay.net/~dwills/mussels/alafwsp1.html. Has extensive lists of shells from the Gulf of Mexico, land shells of Alabama, freshwater shells, etc. Good pictures for identification. An excellent reference resource link with many links to different pages to keep you busy.

***** CONE SHELL COLLECTORS, http://www.coneshell.net. Giancarlo Paganelli announces on Conch-L every now and then when he adds new shells to his site. It is without doubt the most thorough collection of cones on the web; a quality site with superb images and lots of information.

**** THE LIGUUS PAGE, http://www.geocities.com/Eureka/Gold/9440/liguus/lighompa.html. A long URL but if you like tree snails, it is well worth a visit (try a Google search for *Liguus*). Many pictures, a reference list, and much information. An uncomplicated site with easily referenced images of the many forms of this colorful treesnail.

***** THE LIVING WORLD OF MOLLUSCS, http://members.lycos.co.uk/Mollusks/haupt.html. A site with frames-don't like frames but worth a visit. Many, many pictures and much information. A German site, available in German and English. Give this site a try, you will not be disappointed.

**** THE POLYMITA PAGE, http://www.geocities.com/Eureka/Gold/9440/polymita/polyhompg.html. Another long URL but worth a visit if you like treesnails. There are lots of pictures and much information, including distribution maps and literature guide.

**** CONCHOLOGISTS OF AMERICA, http://www.conchologistsofamerica.org. The COA web site has a new look and a new locale. The site is still a work in progress but will hopefully continue to grow and improve.

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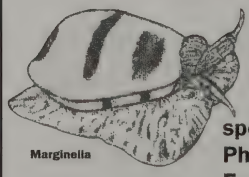

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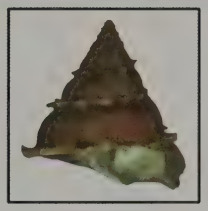
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Florida Fossils

by Kevan and Linda Sunderland

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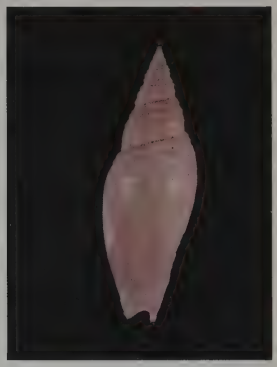
Turbo rhectogrammicus Dall, 1892, 45mm, DeSoto County, FL.



Pleioptygma lineolata (Heilprin, 1886), 72.5mm, DeSoto County, FL.

Hystrivasum horridum Heilprin, 1866, 51mm, DeSoto County, FL.

Subpterynotus textilis (Gabb, 1873), 41mm, DeSoto County, FL.

Heilprinia caloosaensis (Heilprin, 1886), 38mm, DeSoto County, FL.

Turbinella regina Heilprin, 1886, 37mm, DeSoto County, FL.

Dall, W.H. 1890-1903. "Contributions to the Tertiary fauna of Florida with especial reference to the Miocene Silex Beds of Tampa and the Pliocene Beds of the Caloosahatchee River." *Transactions of the Wagner Free Institute of Science of Philadelphia*, 3, 1-6: 1654pp., 60pls.
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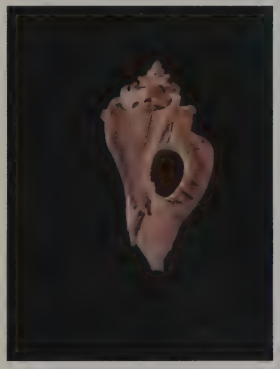
Olsson, A. A. and Harbison, A. 1953. "Pliocene Mollusca of southern Florida." *Academy of Natural Sciences of Philadelphia*, 8: V + 457pp, 65 pls.
Petuch, E. J. 1994. *Atlas of Florida fossil shells.* Chicago Spectrum Press, 394 pp.
Waller, T. R. 1969. "The evolution of the *Argopecten gibbus* stock (Mollusca: Bivalvia) with emphasis on the Tertiary and Quaternary species of eastern North America." *Journal of Paleontology*, 43: V + 125 pp.

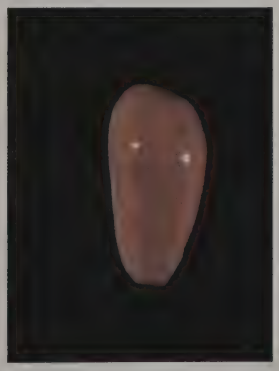
Chicoreus floridanus Vokes, 1965, 36mm, Okeechobee County, FL.

Conus spuroides Olsson & Harbison, 1953, 35mm, Okeechobee County, FL.

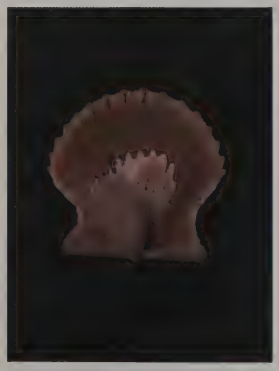


Talityphis floridanus Dall, 1889, 19mm, Okeechobee County, FL.

Morum floridanum Tucker & Wilson, 1932, 17.5mm, Okeechobee County, FL.



Marginella willcoxiana Dall, 1890, 17mm, Okeechobee County, FL.



Argopecten anteamplicostatus (Mansfield, 1936), 15mm, DeSoto County, FL.

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Distribution of Marine Molluscs along the Temperate and Cold Water Regions of the Southern Ocean and Adjoining Zones

by
Zvi Orlin

Key Words
Mollusca, Southern Ocean, Adjoining zones.

Abstract
A list is presented of the Recent taxa shared by the neighboring regions of the Southern Ocean. Differences are pointed out between the zones studied, and regions discussed.

Introduction

Noting during my collection of marine shells worldwide that many taxa in the Southern Hemisphere are found in regions widely separated, a special study was launched of the remote regions in and around the Southern Ocean, concentrating on the following five regions:

1. New Zealand – N. and S. Islands, including the nearby offshore islands of: Kermadec (28° S.), Chatham (44° S.), and the Antipodean Subantarctic Islands (50° S.).
2. Australia – the temperate south coast and overlapping zones on the west coast from Shark Bay (25° S.) to the east coast at the north border of N.S.W. (28° S.), includes Norfolk Island.
3. South Africa – the temperate south coast from Margate (31°S.) to the west coast at Swakopmund (28° S.).
4. Magellanic Region – Southern Argentine, from Peninsula Valdez (42° S.) to Ancud on Chiloe Island (42° S.) in southern Chile, including the Falkland Islands.
5. Antarctica Region – the Antarctic continent and islands of the Southern Ocean south of 50° S. but including Kerguelen, Crozet, and Prince Edward Islands.

(The borders of the regions were determined mainly by the sources of information – see References).

A high degree of endemism is found in the above regions: New Zealand heads the list with 76%; South Africa 52%; in the Magellanic Region, of 627species recorded by D.O. Forcelli, 35% are endemics. For Australia no detailed information has been released so far, but after personal communications with the authors, of F.E. Wells's 671 recorded species of Western Australia shells about 40% are endemic to Australia, and of P. Jansen's 414 recorded species of southeast Australian shells about 80% are endemic to Australia; these are only partial and preliminary figures. Regarding the Antarctic Region, to the best of my knowledge, no final figures are available.

Owing to the high degree of endemism, shared species of these five regions are not common, so the generic level was also noted. These genera are usually found in the regions noted, with some spreading into adjoining regions, and most of the species within a genus are endemic to the regions in which they are found.

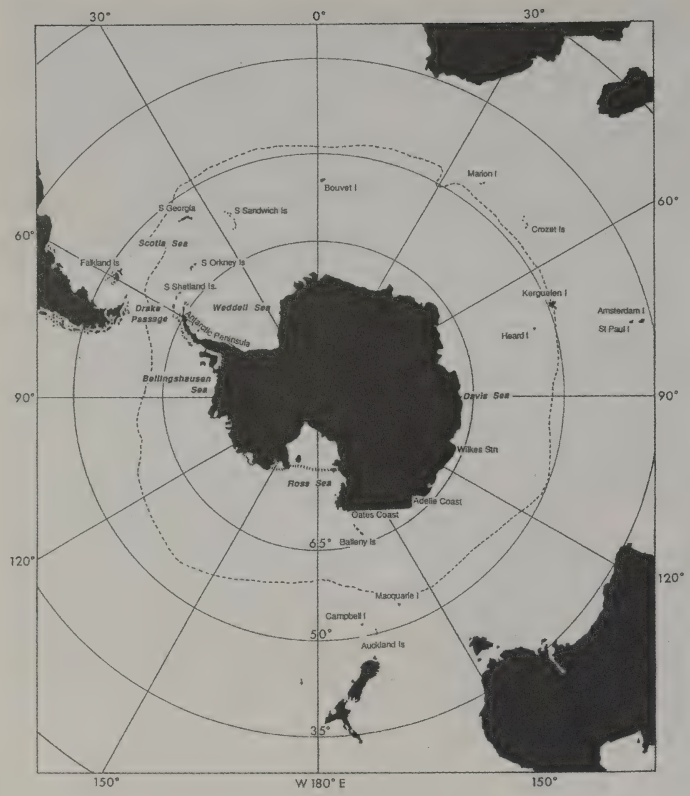
Results

Summing up the results, 176 families shared species and genera in the different regions:

	Australia	New Zealand	Magellanic Region	Antarctic Region	South Africa
Australia		108sp., 157genera	8sp., 71genera	2sp., 52genera	21sp., 38genera
New Zealand	108sp., 157genera		23sp., 95genera	10sp., 73genera	19sp., 40genera
Magellanic Region	8sp., 71genera	23sp., 95genera		100sp., 32genera	7sp., 22genera
Antarctic Region	2sp., 52genera	10sp., 73genera	100sp., 32genera		5sp., 14genera
South Africa	21sp., 38genera	19sp., 40genera	7sp., 22genera	5sp., 14genera	

Discussion

According to these results, geographic proximity is of primary importance in determining distribution. Species similarity usually decreases with geographical distance and is influenced by dispersal limitation. Climatic conditions are an additional important factor, especially in regions where successive Ice Ages were predominant, like the Magellanic and Antarctic Regions and in New Zealand. Such changes no doubt affected the evolution and survival of many taxa. Prevailing ocean currents may also be a contributory factor, with the continuous West Wind Drift encircling the globe in the Southern Hemisphere and reaching the regions in this survey, especially for the free swimming larval stages of development of some taxa. I hope more research will follow in recording the extent of these migrations. Man



is the fourth factor affecting distribution and is becoming increasingly important, with both his effect on the environment, and his wide-ranging vessels crossing the oceans in increasing numbers. Additionally there are the deliberate introductions of species for commercial reasons and the occasional transfer for study purposes and subsequent inadvertent release into the environment.

Australia and New Zealand, separated only by the Tasman Sea, have the greatest affinity according to the shared number of taxa, and are influenced by all four of the above factors. The reason for this largest number of shared taxa, is that both reach into lower latitudes, and subsequently into more favorable climatic conditions. Likewise the Magellanic and Antarctic Regions, separated by the Drake Passage, are even closer together and are also affected by all four factors. Worthy of note is the unusual fact that the shared species of the latter 2 regions are more than double the shared genera (100 species to 32 genera). In all other zones the number of genera far exceeds the number of species, owing to the eventual evolution of endemic species in many genera. This is due to the close proximity and similar climatic conditions. South Africa is the odd one out, surrounded by vast expanses of ocean. With thousands of kilometers between it and the other continental regions, its molluscan fauna is more closely linked to the African countries north, with relatively fewer shared taxa than found in the other regions in this study.

Perhaps most interesting is the high number of shared taxa between the Magellanic Region and New Zealand, despite the tremendous distance between them. This may be partly accounted for by the relative close proximity in former geological eras, prior to extensive continental drift. We must, however, take into account that during those geological eras, both South Africa and Australia were also near the present Magellanic Region. This stresses the importance of climatic factors, as the latter's climates are currently more diverse, as they drifted further north from Antarctica. This subject is better left for the paleobiogeographers, and their findings will be welcomed.

Remarks

An endeavor has been made to relate to species and genera of largely temperate and cold-water regions, but this is to some degree subjective and depends on the sources of information used, of which mine are regrettably incomplete. Many of the cosmopolitan species or genera were not included, as they are considered predominantly tropical and subtropical in distribution. It must be remembered, however, that the temperature of the oceans varies with depth, and therefore some of the species or genera found in subtropical or tropical regions, at the edge of or below the continental shelf, may well live in temperate or cold water habitats. Some of the taxa are also found in temperate and cold-water regions of the Northern Hemisphere and it is considered that these northern genera include many bipolar taxa in the regions of discussion, especially in the Magellanic and Antarctic Regions.

Most of the taxa on the list were found in 2 regions only, but 16 species and 70 genera are found in 3 regions, and even fewer are found in 4 or 5 regions. Altogether 450 taxa appear on the list, relatively few are found in more than 2 regions; this seems typical of temperate and cold-water habitats that limit distribution, owing to more adverse climatic conditions. In contrast, in tropical and subtropical habitats, distribution is far wider, often extending from island to island or along continental coasts over one or two oceans. For example, over 200 species found along South Africa's subtropical east coast are also found in the Red Sea at the northern end of the Indian Ocean, and many hundreds of other species are also found scattered over the tropical Indo-Pacific Ocean.

Owing to the differences of opinions between taxonomists, in some cases alternative names are used for the same genera and some subgenera are elevated to genera. In these cases the alternatives have been inserted in parentheses. Some subfamilies have also been elevated to family level, but the issue is under debate and often the changes are reversed in subsequent studies.

This is a preliminary survey, which will hopefully be followed by more detailed studies and the publication of additional information. The main purpose of this article is to draw attention to some of the remotest regions of our planet, their biodiversity in molluscs, and the affinity of these regions in shared taxa.

Acknowledgements

I would like to thank: Bruce Marshall of the Museum of New Zealand Te Papa Tongarewa, for reading the draft of this article, and adding

valuable additional information and suggestions; Robert Lynch of the Royal Society of New Zealand, for granting copyright permission for the use of a copy of the location map from one of their Bulletins, which appears in this article; Henk Mienis for his assistance in placing at my disposal, all the relevant literature available in the Hebrew University of Jerusalem libraries, and Dr. Ilan Karplus of the Volcani Institute in Rehovot, and my colleague Shai Shafir of the staff of Oranim University, for suggesting some important changes which helped improve the context.

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LOCATION MAP (page 22)

Original source: Dell R.K. 1990: Antarctic Mollusca: with special reference to the fauna of the Ross Sea. *Royal Society of New Zealand Bulletin Series 27*: page 274, map.

Some Southern Ocean shells from New Zealand: 1. *Semicassis pyrum* (Lamarck, 1822, 62mm; 2. *Ranella australasia* (Perry, 1811), 99mm; 3. *Argobuccinum postulosum tumidum* (Dunker,1862) 78mm; 4. *Psychrochlamys delicatula* (Hutton,1873), 62mm.

Editor's note: There is a five page table available to accompany this article listing many of the species found in the cold water of the Southern Ocean. The table is broken down by family and each of the five areas as discussed by the author. This table is available from the editor as hard copy or .doc attachments to email.

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Two (or Three or Four?) Little Known Popular Shell Books by the Late Dr. Tadashige Habe

by
Richard E. Petit

The books discussed here were written by the late Dr. Tadashige Habe. They are rarely, if ever, cited in the scientific literature as they contain neither descriptions of new species nor data of taxonomic import. They are, however, very interesting books, containing a lot of information on mollusks as well as good color photographs of shells. As only one of these books is in English, it is the one that receives the most attention herein. All of the books discussed here are 4" x 6", softbound, with clear plastic dust jackets. To avoid much tedious repetition, each book, whether differing by title or printing number, will be identified by a number in [ ]. Unfortunately, before the contents can be

[1] The first *Shells of Japan* (top left), published in 1968, is in Japanese and paginated from back to front. [4] The third English language edition, *Shells of the Pacific* (second from the top), 1975, has a new title and credits T.I. Elliot with translating. [6] The fifth English language edition (second from the bottom) returned to the original title, *Shells of Japan*, 1978. [7] The final Japanese language edition (bottom) , *The Natural History of Shells*, March 5, 1975; marked a return to the Japanese language and more color plates.

discussed it will be necessary to distinguish between these different printings.

The ambiguity in the title of this article stems from the fact that one book, *Shells of Japan*, exists in three forms: entirely in Japanese, in English with the same title, and in English with the title changed to *Shells of the Pacific*. Habe wrote another book of the same size, but with different content, that was published in Japanese as "*Shells. A record of their natural history*" which can also be translated as "*The natural history of shells*."

These books were all published by Hoikusha Publishing Co., Ltd., Osaka, Japan. That firm was a prolific publisher of natural history books but best known to English-speaking shell collectors for publishing the two volumes of *Shells of the Western Pacific in Color*. Most of their publications contain lists of their other publications. This is mentioned as their numbering is confusing, especially with these shell books. The first appearance (1968) of *Shells of Japan* was in the series "Color Books" that contained, at its publication, 160 titles of which *Shells of Japan* was number 157. In reading their lists of publications particular attention must be paid to the book size, which is given in inches. The book under discussion, and all in the series, is 4" x 6." When the English version appeared in 1971 it became number 25 in the "English editions series" that bears the same "Color Books" logo. In the 6" x 8" series ("*Colored Illustrations for Naturalists, text in Japanese, index in Latin or English*") number 25 is *Colored Illustrations of the Shells of Japan, Vol. II.* The latter was also issued in English ("English Editions, book size 7" x 10"") series, but there is no publication number assigned. Confusing is the fact that the entirely different Japanese language "*The natural history of shells*" is number 25 in the Color Nature Guide Series of the same publisher.

[1] [**Shells of Japan**] (in Japanese). Published September 20, 1968. The front cover is a photograph of various shells (*Thatcheria*, *Guildfordia*, scallops, muricids, etc.) on a background of coarse sand. It is arranged in Japanese format (i.e., with the cover on the "back" and pagination from back to front). When referring to books arranged in this style the term recto must be understood to mean a left-hand, or odd numbered page and verso a right-hand, or even-numbered page, just the opposite of non-Japanese works. Unnumbered introductory pages consist of the title page (blank on verso), a one-page author's preface, followed by two pages listing contents, with an illustration on the verso of the second contents page. These pages are followed by pages 1-153. The verso of page 153 has a photo of Dr. Habe with his basic biographic details and the colophon, followed by six unnumbered pages listing Hoikusha books.

The book is profusely illustrated with color plates and there are many line drawings in the text. Pages 97-139, on "habitat and history of shells" with notes about various species, have illustrations in the margin of postage stamps depicting shells. These do not appear in the English edition. Also not in the English printings is the aforementioned illustration on the back of the contents page. This is a reduced copy of an old print showing five Japanese ladies playing the matching game that is made from *Meretrix* shells. The illustration shows not only the shells arranged in front of the players but also the elaborate octagonal boxes used to store the 720 shell valves used in the game. There is a good color illustration of such shells and containers in Saul (1974: 95, 100, 101).

There is no English in this book. The shells have only their Japanese names, not their Latin names. It is number 157 in the Hoikusha "Color Books" series. Price on the back cover is ¥250. This book was reprinted but the number and dates of printings are not known as they are not listed in the colophon of later printings. A 1974 printing, listed only as a "reprinting" has the imprinted price of ¥500.

[2] **Shells of Japan** (in English). First edition, May 1971. Arranged, of course, in "normal' style. Cover identical to [1] except that the photo is cropped at the top to allow the title panel to extend across the entire width of the cover. Contents consist of title page with publication date and data on its recto followed by two pages of contents, pages 1-139, followed by four pages of listings of Hoikusha books. Pages 124-139 are Latin name plate captions. The primary difference in the number of pages is due to the fact that the English translation occupies more space than the Japanese text. On the last page of the ads, which is for English editions, is a notice to order "from the nearest bookstore, or in the U.S.A. and Canada, order from Nippan, Inc., P.O. Box 1022, Somerville, N.J." This book is number 25 in Hoikusha's "Color Nature Guide" series but it carries the same "Color Books" logo as [1]. Books [2]-[6] do not have a printed price.

[3] **Shells of Japan**. Second edition, September 1971. Although labeled as an "edition" it differs from the 1st edition only in the date and the addition, under the printing data, of [Book Code Number] 0145-540025-7700.

[4] **Shells of the Pacific**. Third edition, 1975. This edition differs from [2] and [3] in several respects in addition to the title change. The title page has disappeared and the printing data is on the recto of the second contents page. For the first time it is stated that the book is "translated by T. I. Elliott" and that it is "No. 25 of Hoikusha's Color Books Series." Previously the "25" appeared only on the spine. Although the title is changed, the Book Code Number remains unchanged. On the last page of ads the price of the English edition is dropped and at the bottom of the page is "Distributors in Australia and New Zealand / Paul Flesch & Co., Pty., Ltd. / Melbourne, Australia." Most copies seen have a blue sticker with "Japan Publications Trading Co. / Elmsford, New York, U.S.A. / Printed in Japan" affixed below that data. The listing of 4" x 6" books still lists Number 25 as "Shells of Japan." This title is not listed in Habe's bibliography (Habe, 1980) nor are any of the other "editions." He lists only [1], [2], and [7].

[5] **Shells of Japan**. Fourth edition, 1975 [no month stated]. Identical to [4] except for title and reversion on last ad page to text of [2].

[6] **Shells of Japan**. Fifth edition, 1978 [no month stated]. Identical to [5] except for date and lack of the name of any supplier on the last ad page.

[7] **The Natural History of Shells**. March 5, 1975. Almost entirely in Japanese, this book is listed here to complete the series of 4" x 6" books by Habe. The arrangement of the book is front to back as in English language works. The front cover is a photograph of two *Spondylus*. The book has an author's preface, contents, credits, etc. on pages [i-iv] followed by pages 1-151 with 8 unnumbered pages of ads at the end. The unnumbered verso of page 151 has

the colophon with publication data and a photo of Habe. The photo is the same as in the other books treated here but there is considerably more biographical data here than in [1]. The book is full of very good color illustrations showing shell color, patterns, sculpture, interior structure, ethnological uses, in religion, producing pearls, dye, as food, etc. There is a striking photograph of what is aptly described as a mountain of *Turbo* shells, the animals of which were used as food. Unfortunately there is almost no English in this book. The term "malacophilately" is used in a section on shell stamps and a few species, mostly cowries, are identified by English common names in the discussion. There are two species identified with Latin names in the introduction but the only other Latin names appear where the author managed to bring in the genus *Habea*. Anyone finding a copy of this should purchase it even if they cannot read Japanese. The photographs are worth having even without a readable text. Price on the back cover is ¥380.

Printings [2]-[6] differ from [1] in that many of the text photographs have been removed to make room for the English text. In most cases where there are black and white photographs on facing pages, one of them has been removed. The fact that Hoikushu Publishing Co., Ltd., rarely corrected errors and corrections, when made, often resulted in other errors, is well documented (Bieler & Petit, 1990; Petit & Bieler, 1996; Callomon & Petit, in press). In [1] on each of pages 58 and 59 there are photographs of two shells. One is of *Pinctada maxima* and *Pinctada margaritifera*, the other of *Cassis cornuta* and *Charonia tritonis*, all identified only by their Japanese names. In [2] the *Pinctada* photo was eliminated. The other photo was retained in reduced size but in the transfer it was reversed and the shells appear to be sinistral. Also, the Latin names of the two *Pinctada* were used as the caption. In [3] the photo was reversed again, making the shells properly dextral, and the caption was changed to *Cassis cornuta* and *Cypraecassis cornuta*. This error is more complex than it first appears, as in [1] the correct Japanese name (*Hora-gai*) was used as the caption for *Charonia tritonis* but the species is not mentioned in the text in any printing, as this page is about shells used for cameos. In [3] when the publishers attempted to correct the Latin caption, they used the species names mentioned in the text, not the species illustrated. This final error was never corrected and [3]-[6] are identical in this respect.

Another correction had a better result, although it took a long time. In [2]-[5] the second paragraph on page 16 ends in the middle of a sentence. This was corrected in [6] by the deletion of the incomplete sentence. Many easily corrected spelling errors were never corrected, such as the hyphenation of *Mikado-trochus* in the heading on page 1, although correctly rendered in the text. There are numerous typographical errors where a word or species is misspelled but appears correctly elsewhere in the book, such as *Cella* (twice) instead of *Cellana* on page 15. Another equivalent error, the incorrect specific name termination on *Hemifusus ternatana* in [2] was corrected to *H. ternatanus* in [3]. Hilgendorf is misspelled on page 50, certainly a typesetter's error, but it does not detract from Habe's short and interesting history of the Japanese slit-shells. On the next page the never-corrected misspelling of "carrying" as "canying" in no way detracts from the interesting reason for the Japanese name for *Xenophora pallidula*. On page 62 "veligers" is correctly spelled four times in the text but in the paragraph heading it is rendered as "veligens." This never-corrected error is typical Hoikusha and the fault must rest with the publisher, not with the author.

It is interesting that the monetary exchange rate was belatedly acknowledged in [6] when the price of three rare cowries, which had been given in earlier printings as "¥100,000 (=US$280.)," was changed to "¥100,000 (=US$416.)." No such adjustments were made for other valuations in the book where values were expressed in words and not figures (e.g., "sixty dollars or twenty thousand yen" on page 51).

Any printing of [2] through [6] is highly recommended to all interested in shells as the book(s) contains a lot of information about shells, their lives, and their usages. There are many colored illustrations and line drawings throughout, with a lot of information crowded into a small volume. Dr. Habe's sense of humor is evident in such comments as his statement about *Mercenaria* that "the meat is tough and goes well with whiskey." In the same paragraph, which is headed *Mercenaria stimpsoni*, he speaks of having them served ("them" referring to *M. mercenaria*, not the Japanese species; a misunderstanding attributable to the translator) in a New York "tavern for longshoremen" where "when the meat was scooped out, muddy water also came out." Later on the same page (55) he mentions *Neptunea*, about which he states, "the taste is even better when you eat this shellfish while drinking Japanese saki." Comments on symbolism abound, as do extensive comments about the uses of various mollusks for food.

These books have only two real negatives. One is the fact that the shells on colored plates are numbered and one must refer to a list in the back for the names. The other is the small size. The amount of information contained makes one wish for a larger and longer format. An excellent overview of shells is presented in [7] as stated in the title but the book has never been translated into English.

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Richard E. Petit
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2005 SHELL SHOWS & RELATED EVENTS

The Following information is subject to change, so please verify with the individual organization.

Jan. 21-23 **SPACE COAST SHELL FESTIVAL,**
Melbourne, FL
The Melbourne Auditorium, 625 E. Hibiscus Blvd.
Jim & Bobbi Cordy, 385 Needle Blvd.
Merritt Is., FL 32953
(321) 452-5736 E-mail: corshell@earthlink.net

Feb. 4 - 6 **BROWARD SHELL SHOW**, Pompano Beach, FL
Pompano Beach Recreation Center, NE 18th Av. & NE 6th St.
Jim VunKannon, 2219 NE 16th Court
Ft. Lauderdale, FL 33305
(954) 561-0120

Feb. 18-20 **SARASOTA SHELL SHOW**, Sarasota, FL
Sarasota Municipal Auditorium, Tamiami Trail
Lynn Gaulin, 4407 33rd Ct. East
Bradenton, FL 34203
(941) 755-1270 E-mail: shellhunter@att.net

Feb. 25-27 **ST. PETERSBURG SHELL SHOW**, Treasure Is., FL
Treasure Is. Community Center, 1 Park Place
Bob & Betty Lipe, 348 Corey Avenue
St. Petersburg Beach, FL 33706
(727) 360-0586; FAX: 360-3668
E-mail: rlipe1@tampabay.rr.com. Exhibit form available at web site: http://web.tampabay.rr.com/shellclub

Mar. 12-13 **XVIIéme RECONTRES INTERNATIONALES DU COQUILLAGE**, Paris, France
Bourse de Commerce, 2 rue des Viarmes, 75004 Paris, France
M. & D. Wantiez, 88, Rue du General Leclerc
95210 Saint Gratien, France
33 (1) 34-17-00-39 E-mail: wantiez.mada@libertyserv.fr

Mar. 3 - 5 **SANIBEL SHELL SHOW**, Sanibel, FL
Sanibel Community Center, Periwinkle Way
Anne Joffe, 1163 Kittiwake Circle
Sanibel, FL 33957
(239) 472-315 E-mail: sanibelchiton@aol.com

Mar. 17-19 **MARCO ISLAND SHELL CLUB SHOW XXIV,**
Marco Is., FL
Marco Presbyterian Church, Elkcam Circle
Amy Tripp, 961 Swallow Ave., #208
Marco Island, FL 34145
(239) 393-1770

April 30 **BRITISH SHELL COLLECTOR'S CLUB CONVENTION,** N. Romford, England
N. Romford Community Centre, Clockhouse Lane, Collier Row
Tom Walker, 38 Redlands Road
Reading, Berkshire RG1 5HD, England
44 (118) 987-4294 E-mail: tom@tmwalker.co.uk

May 7 - 8 **XV BELGIUM INTERNATIONAL SHELL SHOW,**
Antwerp, Belgium
Schijnpoort, Schijnpoort Straat
L. Broekmans, Gerststraat 4
B-2861 O.L.Vrouw-Waver
Belgium
32 15 76 15 77 E-mail: bvc.international@pandora.be

Oregon Shell Show, Portland, OR (*)
Oregon Museum of Science & Industry, Portland
Maxine Hale, 347 N.E. 136 Avenue
Portland, OR 97230-3308
(503) 253-5379

Jun. 26-30 **JOINT AMERICAN MALACOLOGICAL SOCIETY/ WESTERN SOCIETY OF MALACOLOGY MEETING,** Pacific Grove, California
Asilomar Conference Grounds, Asilomar Avenue
Dr. Dianna Padilla, Dept. of Ecology & Evolution
SUNY at Stony Brook, Stony Brook, NY 11794 USA
(631) 632-7434 e-mail: padilla@life.bio.sunysb.edu

Jul. 19-24 **CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION,** Ft. Myers, FL
Sanibel Harbor Resort Hotel, Fort Myers
Anne Joffe, 1163 Kittiwake Circle
Sanibel, FL 33957
(239) 472-3151 E-mail: sanibelchiton@aol.com

(*) - Date to be announced

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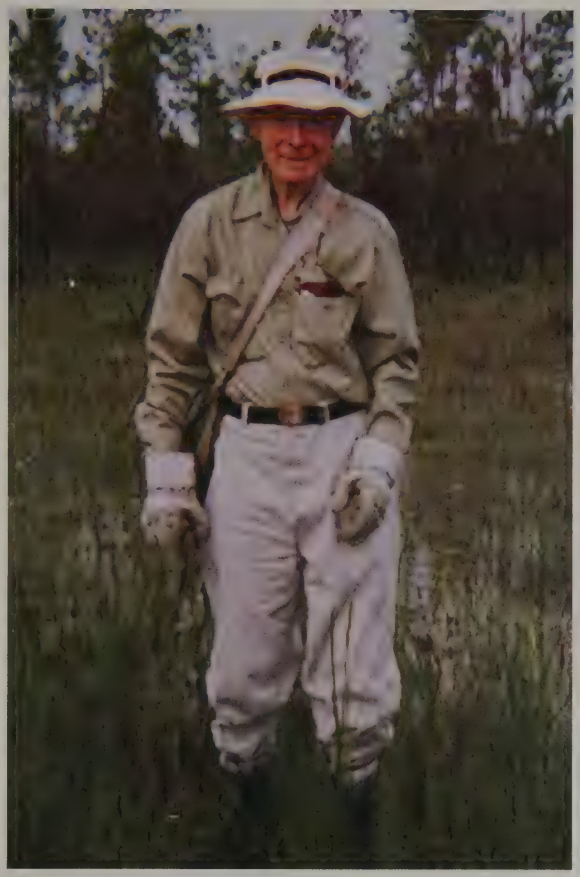

Liguus fasciatus tree snails in a tree in Everglades National Park. It was a sight similar to this that started Archie Jones on his long involvement with these fascinating and colorful mollusks. Inset is a living *Liguus fasciatus roseatus* Pilsbry, 1912. Images courtesy of Bill Frank and the Jacksonville Shell Club.

Meet Archie Jones

Archie Jones is a self-described "sheller," a term he favors over the more formal malacologist or conchologist. He is probably best known, and in fact is renowned, for his work with Florida tree snails of the genus *Liguus* (family Orthalicidae). He also collects and is very knowledgeable about other tree snails such as Xanthonychidae (genus *Polymita*), and Achatinellidae (genera *Achatinella* and *Partulina*). His interest in tree snails spans several decades and, while he is knowledgeable about a variety of different tree snails, his favorites remain the Florida *Liguus*.

Archie was born September 4, 1910, in Palatka, Florida. His parents both died in drowning accidents when he was fairly young. His formal education ended after the 10th grade and he began earning a living for his family. His more important, but less formal, education continued as he is an avid reader of philosophy, malacology, biology, history, etc. He worked at a variety of jobs in Florida until 1938 when he and his wife Margarate moved to California. He served in the US Army during World War II and after the war worked as an accountant and then an executive for a drug company until retirement. It was also after the war that he moved back to Miami, where he has lived ever since. Margarate died on October 21, 2000.

Archie's interest with *Liguus* tree snails began when he spotted one of the colorful mollusks in a tree outside of Pinecrest (before it was more than a few houses, a post office, and a schoolhouse) while he was resting during a tropical fish hunting expedition. He has been hooked ever since.

As his interest in these colorful mollusks grew he soon realized that encroaching development in southern Florida was destroying the hammocks and other environmental niches the snails depended upon. In 1957 he joined with friends and began transplanting snails from endangered areas to habitats within protected areas like Everglades National Park. The colonies they started are now often the only surviving remnants of individual subspecies or color forms.

Archie still goes into the field to collect and study *Liguus*. Anyone who has ever ventured more than 100 feet off the road in the Everglades knows this is a difficult and harsh environment. At 94, Archie still braves the heat, mud, snakes, alligators, mosquitoes, and thick underbrush of the Everglades to collect and study. This is testimony to the inner resolve and dedication of this taciturn "sheller" who has given so much to our avocation. There are few people who can actually say they have helped save a species.

Notadusta eugeniae Paratypes Found

by
Don Cram

Subsequent to my recent articles in *Australian Shell News* No.119, September 2003, and *American Conchologist* Vol.31, No.4, December 2003, on the holotype of *Notadusta eugeniae* Cate, 1975, I was contacted by Dr.Kevin Roe of the Delaware Museum of Natural History, USA, informing me that paratypes No.1 from the Eugenia Wright collection and No.2 from the collection of Dr. Lawrence Kienle were held at that institution. Dr. Roe kindly arranged for both these specimens to be sent to Museum Victoria for study. Examination of the two specimens proved beyond doubt that they are the same species as the holotype, being similar to, but specifically different from *Cypraea xanthodon* Sowerby, 1822.

Dr. Burgess in *Hawaiian Shell News* Vol.15 (12): 7-8 synonymized *Notadusta eugeniae* with *Notocypraea declivis* (Sowerby, 1870) and as far as he could determine there were five specimens known. I have been unable to trace the third listed paratype from the collection of Elsie Malone, but I received an e-mail from Dr. Peter Stimpson of Loudon, Tennessee, informing me that he had the fifth specimen. He sent photos with size and tooth details, with the label "off Albany, SW Australia." All of these specimens appear to have been collected at or around the same locality. The holotype and paratype No.1 were collected at or below the low tide line on 14 March 1974 at Hopetoun, southwest Australia, while the label on paratype No.2 reads "Hopetoun, SW Australia," but gives no date of collection.

In an attempt to find out who collected the specimens I contacted Phillip Clover, a long time shell dealer in California, who advised me that he did supply the specimen to Dr. Stimpson several years ago. This is the specimen he reviewed and figured in *La Conchiglia* 89-90, 1976, and listed as a semi-fossil *Cypraea xanthodon,* beach collected at Albany SW Australia. His data slip for this shell reads, Belgium Collection gift from Dutran Noit Alex, with a listed address of 131 Elizabeth, Knokke B8300 Belgium, but it is unknown if he was the original collector.

The holotype and both paratypes have clearly been live collected. Paratype No.1 is sub-adult and No.2 is fully formed but not as thickened or heavy, as is the holotype, and is probably a younger shell. The specimen in the Stimpson collection is much larger than any of the type series. All these specimens have coloration, banding, shape, and tooth structure characteristics similar to the holotype. Dr. Stimpson reported that the terminal ridge on his specimen was trifid, a feature that is evident in varying degrees in *C. xanthodon.* This feature is not as evident in the specimens I have examined, although paratype No.2 has a second ridge and an almost vestigial third ridge.

After all of this research this species remains an enigma. Although five specimens were found around the same area at the same time, possibly by the same person, all efforts to find the collector have failed. There are no published reports of this species ever being found since, although *Cypraea helvola* has recently been found at Starvation Bay 50km east of Hopetoun, proof that tropical cowries do exist that far east in the Southern Ocean. Peter Clarkson (pers. comm.) has dived around that area several times and has not seen anything like this shell. The fact that it is a tropical cowry, possibly related to *Cypraea xanthodon,* an endemic species restricted to the coastal areas of Queensland and northern NSW, is also puzzling. Due to its type locality, distinct dorsal pattern, coloration, spotting, and the existence of five specimens, four of which have been critically studied, *Notodusta eugeniae* Cate, 1975, should now be considered a valid species and be reassigned to the subgenus *Erronea* Troschel 1863.

I would like to thank several people who have given me much assistance with this project, particularly Lindsay Groves of the Los Angeles County Museum and Dr. Kevin Roe of the Delaware Museum of Natural History for sending the type material to Melbourne, Dr. Robin Wilson and Chris Rowley of Museum Victoria for their handling of the loans, and David Staples for photos of the the paratypes. Dr. Peter Stimpson has been most helpful with information on his specimen, which appears to be the only one in private hands. I have also had helpful comments from Ed Heimen of Israel, Bill Frenzan of the USA and Thora Whitehead of Queensland. Thanks also to Robert Burn (Honorary Associate Museum Victoria) who has been of great assistance and has encouraged me to pursue this study and publish the results.

Details Ct = Columellar teeth, Lt = Labial teeth, Wt = Weight in grams.

Paratype
No.1 DMNH 201199 Eugenia Wright collection.
L = 27.6mm W = 17.1mm H = 14.1mm Wt = 1.65g Ct = 19 Lt = 24

Paratype
No.2 DMNH 196224 Lawrence Kienle collection.
L = 27.2mm W = 15.4mm H = 12.6mm Wt = 2.2g Ct = 18 Lt = 24

Holotype
No. 3 LACM 1704 Crawford Cate collection.
L = 26.8 W = 16.8mm H = 13.5mm Wt = 2.99g Ct = 17 Lt = 24.6

Paratype
Stimpson Collection (not illustrated).
L = 32.3mm W = 18.5mm H = 15.0mm Wt Unknown Ct = 19 Lt = 20

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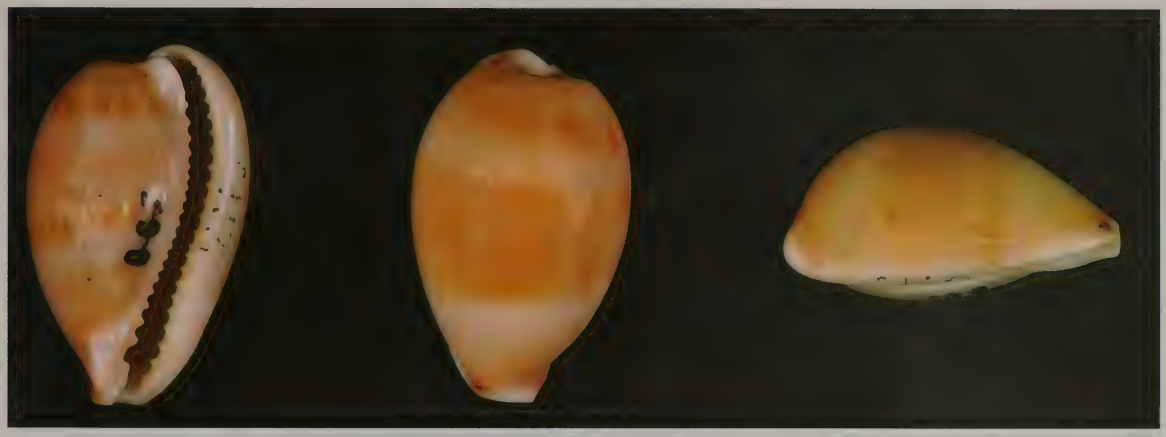

No. 1 *Notadusta eugeniae*, paratype from the Eugenia Wright collection, DMNH 201199.

No. 2 *Notadusta eugeniae*, paratype from the Lawrence Kienke collection, DMNH 196224.

No. 3 *Notadusta eugeniae*, holotype from the Crawford Cate collection, LACM 1704.

The Gold-footed Snail

by
Craig R. McClain

Few people, even among deep-sea scientists, find themselves blessed with an opportunity to visit the deep ocean floor beyond the continental shelf. I count myself lucky to be among the few who have witnessed this habitat first hand in a submersible. Most of our understanding of the deep sea, the seafloor beyond the continental shelf, does not come from submersible dives but rather from dropping or dragging sampling gear on or across the ocean bottom. Both submersible dives and the deployment of gear from research vessels require massive technological feats and major financial expenditures. A colleague of mine once compared deep-sea research to sampling forests from a hot air balloon. For myself, I find a useful analogy in the controlling of the Mars Rovers from Earth. Understanding and exploring an environment covered by thousands of meters of water continues to present a formidable challenge. Predictably, the deep sea remains the least explored environment on earth. Only a small fraction, estimated to be less than 5%, of the total deep-sea floor has been sampled or observed.

My first experience in a submersible occurred near the Bahamas in the Johnson *Sealink* operated by Harbor Branch Oceanographic Institute. As a young graduate student I was elated by the prospect of viewing my study habitat for the first time. This excitement was soon replaced with anxiety as I packed myself into the small titanium sphere of the submersible that houses the crew. Our dive was only to 700 meters, shallow when compared to dives in the *Alvin* that can be over 5 times this depth. Even for a dive this shallow it took approximately an hour to reach the bottom and an additional hour to resurface. At the bottom we spent barely an hour before rising again. Most of us would not consider making a trip in our cars where we spent more time in transit than at the actual destination (though I do remember an eight-hour road trip as an undergraduate in Arkansas to see a now non-existent band). Upon reaching the surface, we bobbed like a buoy for some time before being returned to the deck of the ship. All research subs, including the *Sealink*, are designed for submergence and not for prolonged periods at the surface. The roll and pitch of the submersible at the surface, even in light seas, is often enough to make even those with sea legs turn green.

Despite the obvious obstacles, deep-sea scientists are driven by unanswered scientific questions and the potential to find one of the improbable creatures that inhabit this dark expanse. Collecting or observing a new organism from the deep is highly problematic. This reflects the aforementioned constraints on deep-sea research, but in part also reflects the infancy of the field. It was only in the late 1960's that Robert Hessler and Howard Sanders called attention to the remarkably high species diversity found in the mud on the ocean floor. This vast environment has more species per square meter than any other habitat, including tropical rainforests. The consequence of these factors, combined with the relatively few deep-sea taxonomists, is the reason a majority of deep-sea species are undescribed or unknown to science. It is not shocking then that recent deep-sea samples from vents in the Indian Ocean would yield new species. The find described here, however, is remarkable in that the newly discovered gastropod possesses morphological features unlike any previously described by biologists.

A cluster of *Rifitia pachyptila* at the hydrothermal vent from the Guaymas Basin. Noticeable are the bright red plumes or branchial organs extending out of the chitinous tubes. Also pictured are several yellow bacterial mats. *Picture courtesy of Cindy Lee Van Dover.*

Hydrothermal vents were discovered in 1976 in deep waters near the Galapagos Islands. Lonsdale and colleagues found evidence of pockets of extremely warm water and giant bivalves, an astonishing breakthrough considering a majority of the seafloor deeper than 200m is extremely cold (less than 5°C) and dominated by taxa less than 5mm in

size. These findings, and subsequent dives in the submersible *Alvin* in the following years by Corliss and others, revealed an entirely new habitat located 2.5km below the sea surface. Multiple hydrothermal vents were soon discovered in other areas on the seafloor with high tectonic activity. Almost 30 years and 2000 scientific articles later, vents are known from nearly every part of the sea floor where oceanic ridge spreading is identified to occur.

A swarm of amphipod crustaceans (white cloud) over small bed of vent bivalves (yellow) at the East Pacific Rise. *Picture courtesy of Cindy Lee Van Dover.*

Hydrothermal vents arise from ruptures in the newly created basalt along mid-oceanic ridges. These fractures allow the surrounding cold water to penetrate the crust (upwards of 2-3km thick) and mix with hot basalt. This mixture emerges through three distinct hot spring types on the seafloor. In some cases the liquid simply emerges through a crack or crevice at temperatures ranging from 5-250°C. In other areas, the vent liquid emerges though chimney structures formed from precipitated minerals that collect due to the surrounding low temperature and extreme pressures (1atm for 10 meters of water). These can be either black smokers (270-380°C) or white smokers in which the vent liquid escapes as a cloudy plume at slightly cooler temperatures.

The lack of light at these extreme depths precludes plant life. Deep-sea organisms, except those at specialized habitats such as vents, are completely reliant on a flux of organic matter that sinks from overhead surface waters. This flux has been estimated to be quite small; consequently most of the deep sea is characterized by both a low number of individuals and relatively low biomass when compared to other environments. The exceptions are hydrothermal vents (methane seeps as well, though not discussed here) and have led authors to refer to them as oases. The vent liquid provides a rich source of sulfur that chemoautotrophic bacteria can utilize as an energy source to change carbon dioxide and methane into a usable carbon sugar. This contrasts with plants that use light as an energy source to change carbon dioxide into usable sugars. Several vent species, ranging from bivalves to marine worms, have evolved symbiotic relationships with these chemoautotrophic bacteria.

The geological and chemical distinctiveness of hydrothermal vents is paired with a fauna that can be equally termed unique. One of these organisms, the tube-dwelling worm *Riftia pachyptila* Jones, 1981, lacks both a mouth and digestive track at the adult stage. Instead, *R. pachyptila* possesses a specialized organ, the trophosome that houses a symbiotic microbe (estimated at 285 billion bacteria per ounce of tissue). Extending out of their chitinous tubes is a bright red retractable plume. This is an organ of gas exchange between *R. pachyptila* and the surrounding water and allows for the acquisition of oxygen (for aerobic metabolism of the worm), hydrogen sulfide (as the energy source for the symbiotic bacteria), and carbon dioxide (the source of carbon for food). The anomalous morphology and anatomy are unlike most other marine worms and have caused some contention on the taxonomic placement of *R. pachyptila* and other vestimentiferan worms. Some consider the Vestimentifera a separate phylum and others place it as a class within the phylum Pogonophora, a group that includes other gutless marine worms.

Another 'worm' phylum is Annelida, the segmented worms, divided into the Oligochaeta (earthworms), Hirudinea (leaches), and Polychaeta (marine worms). Hotter vents typically possess the polychaete *Alvinella pompejana* Desbruyeres and Laubier, 1980 or 'Pompeii worm' discovered in the 1980's by French scientists. Unlike *R. pachyptila*, these worms possess guts and filter-feed on the free-living bacteria found in the water around hydrothermal vents. They usually grow over 10cm in length and reside in tubes that form a honeycomb structure around both vent openings and white smokers. Their proximity to the hot fluids of the vent makes them the most heat-tolerant organism on earth (near 55° Celsius or 131° Fahrenheit). In part this heat tolerance is due to a brilliant adaptation. Bacteria feed on mucus secreted by the back of the Pompeii worm and form strand-like colonies that provide insulation to the worm.

Inspired by multitudes of vent worms, scientists have given names such as 'Garden of Eden' and 'Rose Garden' to many hydrothermal vents. Other names, like 'Lucky Strike' and 'Broken Spur,' reflect the geological features at or near the vents. Dense aggregations of two common species of bivalves *Calyptogena magnifica* Boss and Turner, 1980 (Vesicomyidae) and *Bathymodiolus thermophilus* Kenk and Wilson, 1985 (Mytilidae) have inspired the names of 'Clam Acres,' 'Clam Bake,' and 'Mussel Bed.' These vent mussels and clams are the giants of deep-sea bivalves. I have personally worked with typical deep-sea bivalves in which an entire sample of individuals could fit on a dime. Both *C.*

Left: Ventral view of the 'Gold-footed Snail' newly discovered from Kairei vent field. Sclerites are visible and have a rusty color from storage in lab grade ethanol. Scales are normally black to dark gray in color. *Picture courtesy of Anders Warén.*

Below: Multiple views of the empty shell of the 'Gold-footed Snail.' Of note is the large aperture, the strong spiral cording, and the rounded axial ridges. *Picture courtesy of Anders Warén.*

magnifica and *B. thermophilus* also possess symbiotic bacteria that reside in their gills. Bacterial densities can reach such high numbers that over 75% of the gill tissue can be bacteria.

Hydrothermal vents possess a molluscan fauna that is both unique and fascinating. This fauna includes over 30 limpet species and several new described species of gastropods. One such newly discovered gastropod might be the most interesting find thus far at a hydrothermal vent. I admit my bias here, as most of my interest lies with studying deep-sea gastropods. Nonetheless, the discovery of 'gold-footed' snails at the Kairei vent field in the Indian Ocean is fascinating (*Science* 2003, v.302, pg. 1007). The Kairei vent field had been discovered by the Japanese a few months prior to its investigation by Cindy Lee Van Dover, a hydrothermal vent biologist. "We used *Jason* [a remote operated vehicle] and were funded to undertake a geological and ecological description of the site and to relate the Indian Ocean fauna to other vent faunas around the world," states Van Dover. When samples of another gastropod from near the base of the sulfide mounds where brought aboard the research vessel, several specimens of this new snail were in the same bin. "I was sure that such a snail was not previously known from any vent site. What I did not realize for a long time was that this [unique] morphology was unknown throughout all of the mollusca, fossil and modern." Recognizing it was something unique, Van Dover sent specimens to Anders Warén, a deep-sea gastropod specialist, for identification.

At this point I should note that the foot of the snail is mineralized with pyrite and greigite. (Many of you might note the misnomer here, as pyrite is only 'Fool's Gold,' but in deciding on a temporary common name for the article, 'Fool's Gold-footed Snail' seemed too long. I hope all will forgive the intentional misnomer for the sake of creative writing.) The scales or sclerites can be up to 8mm long and cover the length of the foot. Each sclerite possesses an inner core of pedal tissue that extends to just short of the tip. Between this inner pedal tissue and outer mineralized layer is conchiolin, the fibrous protein that creates the inner shell, embedded with iron sulfide granules. The presence of mineralized scales is remarkable in itself, but the existence of iron sulfide as a skeletal material is unknown from any other animal. The researchers report

that the purity of the sulfides, among other lines of evidence, suggests this process is controlled by the gastropod itself. Based on mitochondrial DNA sequences, the 'Gold-Footed Snail' is currently placed in the order Neomphalina with other hydrothermal vent snails that possess a conchiolin operculum. It is believed that the sclerites in this newly discovered species evolved recently and are homologous to the operculum.

Undoubtedly, the forthcoming taxonomic description will further elucidate the uniqueness of the 'Gold-Footed Snail' (and, I hope, provide a better name). Despite the technological advances that have bolstered deep-sea research, we have as yet uncovered only a small portion of the mysteries likely to be found in the abyss. It is probable that further exploration of the deep will continue to yield new species that challenge our views, with respect not only to the limits of adaptation by organisms in extreme environments but also on life in general.

I would like to extend my thanks to Cindy Lee Van Dover and Anders Warén for their generous comments and contributions of pictures for this article. I am also in debt to M. Gaither-McClain and B. Neville who provided invaluable editorial comments.

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